INVITATION TO BID

ITB #4273

VETERANS MEMORIAL INDOOR ICE ARENA RENOVATION

Due Date: Wednesday, March 27, 2013 by 2:00 PM

Issued By:

City of Ann Arbor
Procurement Unit
301 E. Huron Street
Ann Arbor, MI 48104

Version 2012

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ADVERTISEMENT
FOR THE
VETERANS MEMORIAL INDOOR ICE ARENA RENOVATION
CITY OF ANN ARBOR

BID NO. ITB-4273

Sealed Bids will be received by the City of Ann Arbor Procurement Unit, 301 East Huron Street, Fifth Floor, Larcom City Hall, on or before Wednesday, March 27, 2013 by 2:00 PM for the construction of Veterans Memorial Indoor Ice Arena Renovation. Bids will be publically opened and read aloud at this time.

A pre-bid conference will be held Friday, March 15, 2013 at 2:00 PM at the Veterans Memorial Indoor Arena located at 2150 Jackson Avenue, Ann Arbor, Michigan 48103. Attendance is highly recommended.

Work to be done includes the demolition of the existing gutters, downspouts, siding and other appurtenances; the removal and storage of the solar collector system; the furnishing and installation of the new roofing system, gutters, downspouts and siding; replacement of steel purlins; painting; the furnishing and installation of a new lighting control system and other related work.

Bid documents, specifications, and addenda, with the exception of the Plans, shall be downloaded by bidders at either of the following websites: Michigan Inter-governmental Trade Network (MITN) www.mitn.info or City of Ann Arbor Purchasing website: www.A2gov.org. It is the bidder's responsibility to verify they have obtained all information before submitting a bid.

Each Bid shall be accompanied by a certified check, or Bid Bond by a recognized surety, in the amount of 5% of the total of the bid price. A Bid, once submitted, becomes the property of the City. In the sole discretion of the City, the City reserves the right to allow a bidder to reclaim submitted documents provided the documents are requested and retrieved no later than 48 hours prior to the scheduled bid opening.

The successful Bidder will be required to furnish satisfactory performance and labor and material bonds in the amount of 100% of the bid price and satisfactory insurance coverage.

Precondition for entering into a Contract with the City of Ann Arbor is compliance with Chapter 112 of Title IX of the Code of the City of Ann Arbor. The successful Bidder may also be required to comply with Chapter 23 of Title I of the Code of the City of Ann Arbor. Further information is outlined in the Contract Documents.

After the time of opening, no Bid may be withdrawn for a period of 90 days. The City reserves the right to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

Technical questions regarding this project may be submitted in writing to the Consulting Engineer, Stantec Consulting, Attn: Glen Wiczorek, PE via email at glen.wiczorek@stantec.com. Questions by telephone call are prohibited. Questions directed to the Owner are prohibited. The deadline for questions shall be 5:00 PM on Wednesday, March 20, 2013. Questions will not be received after this date.

Any further information on bid documents may be obtained from the Procurement Office, (734) 794-6500.

CITY OF ANN ARBOR PROCUREMENT UNIT

NOTICE OF PRE-BID CONFERENCE

A pre-bid conference for this project will be held on Friday, March 15, 2013 at 2:00 PM at the Veterans Memorial Indoor Ice Arena located at 2150 Jackson Avenue, Ann Arbor, Michigan 48103. At the completion of the pre-bid conference, potential bidders will have the opportunity to view the project site.

Attendance at this conference is highly recommended. Administrative and technical questions regarding this project will be answered at this time. The pre-bid conference is for information only. Any answers furnished will not be official until verified in writing by the Financial Service Area, Procurement Unit. Answers that change or substantially clarify the bid will be affirmed in an addendum.

INSTRUCTIONS TO BIDDERS

General

Work to be done under this Contract is generally described through the detailed specifications and must be completed fully in accordance with the contract documents. All work to be done under this Contract is located in or near the City of Ann Arbor.

The City shall make available to all prospective Bidders, prior to receipt of the Bids, access to the area in which the work is to be performed. Advance notice should be given to the Administering Service Area/Unit in cases where access to the site must be arranged by the City.

Any Bid which does not conform fully to these instructions may be rejected.

Preparation of Bids

Bids should be prepared providing a straight-forward, concise description of the Bidder's ability to meet the requirements of the ITB. Bids shall be written in ink or typewritten. No erasures are permitted. Mistakes may be crossed out and corrected and must be initialed and dated in ink by the person signing the Bid.

Bids must be submitted on Page Numbers ITB 1-3 and on the "Bid Forms" provided with each blank properly filled in. If forms are not fully completed it may disqualify the bid.

Each person signing the Bid certifies that he/she is the person in the Bidder's firm/organization responsible for the decision as to the fees being offered in the Bid and has not and will not participated in any action contrary to the terms of this provision.

Questions or Clarification on ITB Specifications

All questions regarding this ITB shall be submitted via email. Emailed questions and inquires will be accepted from any and all prospective Bidders in accordance with the terms and conditions of the ITB.

All questions shall be due on or before Wednesday, March 20, 2013, by 5:00 PM and should be addressed as follows:

Specification/Scope of Work questions emailed to glen.wiczorek@stantec.com
Bid Process and HR Compliance questions emailed to KLancaster@a2gov.org.

Addenda

If it becomes necessary to revise any part of the ITB, notice of the Addendum will be posted to Michigan Inter-governmental Trade Network (MITN) www.mitn.info and/or City of Ann Arbor web site www.A2gov.org for all parties to download.

Each Bidder must in its Bid, to avoid any miscommunications, acknowledge all addenda which it has received, but the failure of a Bidder to receive, or acknowledge receipt of; any addenda shall not relieve the Bidder of the responsibility for complying with the terms thereof.

The City will not be bound by oral responses to inquiries or written responses other than written addenda.

Bid Submission

All Bids are due and must be delivered to the City of Ann Arbor Procurement Unit on or before Wednesday, March 27, 2013 by 2:00 PM. Bids submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each Bidder must submit one (1) original Bid and two (2) Bid copies in a sealed envelope clearly marked: **ITB 4273 – Veterans Memorial Indoor Ice Arena Renovation.**

Bids must be addressed and delivered to:

City of Ann Arbor
Procurement Unit, 5th Floor
301 East Huron Street
P.O. Box 8647
Ann Arbor, MI 48107

All Bids received on or before the Due Date will be publicly opened and recorded immediately. No immediate decisions are rendered.

Hand delivered bids will be date/time stamped/signed by the Procurement Unit at the address above in order to be considered. Normal business hours are 9:00 a.m. to 3:00 p.m. Monday through Friday. The City will not be liable to any Bidder for any unforeseen circumstances, delivery or postal delays. Postmarking to the Due Date will not substitute for receipt of the Bid. Each Bidder is responsible for submission of their Bid.

Additional time for submission of bids past the stated due date and time will not be granted to a single Bidder; however, additional time may be granted to all Bidders when the City determines in its sole discretion that circumstances warrant it.

Award

The City intends to award a Contract(s) to the lowest responsible Bidder(s). On multi-divisional contracts, separate divisions may be awarded to separate Bidders. The City may also utilize alternatives offered in the Bid Forms, if any, to determine the lowest responsible Bidder on each division, and award multiple divisions to a single Bidder, so that the lowest total cost is achieved for the City. For unit price bids, the Contract will be awarded based upon the unit prices and the lump sum prices stated by the bidder for the work items specified in the bid documents, with consideration given to any alternates selected by the City. If the City determines that the unit price for any item is materially different for the work item bid than either other bidders or the general market, the City, in its sole discretion, in addition to any other right it may have, may reject the bid as not responsible or non-conforming.

The acceptability of major subcontractors will be considered in determining if a Bidder is responsible. In comparing Bids, the City will give consideration to alternate Bids for items listed in the bid forms.

Qualifications

The City will evaluate Proposals based on cost as well as experience. Contractors that have not included the required list of similar work experience, resumes for project manager and superintendent, and associated references in Section 5 of the Bid Form may have their bid rejected.

As part of the proposal, Bidders shall provide documentation that the Bidder's company has at least 10 years of experience performing metal roof construction and metal roof replacement. Bidders shall also submit, for the proposed Project Manager and Superintendent, resumes documenting 7 years of professional experience for each individual in the construction industry as a full-time employee, along with 3 references for each individual from previous projects completed within the past 5 years. Bidders shall also submit the attached form, "Section 5 – References," which identifies a minimum of three projects completed in the past five years at similar facilities including construction cost, contractor and subcontractor information, that demonstrate similar work experience and complexity to that included within these contract documents.

All key staff and subcontractors are subject to the approval by the City.

Official Documents

The City of Ann Arbor shall accept no alternates to the bid documents made by the Bidder unless those alternatives are set forth in the "Alternate" section of Bid form.

The City of Ann Arbor officially distributes bid documents from the Procurement Unit or through the Michigan Intergovernmental Trade Network (MITN). Copies of the bid documents obtained from any other source are not Official copies. Addenda and other bid information will only be posted to these official distribution sites. If you obtained City of Ann Arbor Bid documents from other sources, it is recommended that you register on www.MITN.info and obtain an official Bid.

Bid Security

Each bid must be accompanied by a certified check, or Bid Bond by a surety licensed and authorized to do business within the State of Michigan, in the amount of 5% of the total of the bid price.

Withdrawal of Bids

After the time of opening, no Bid may be withdrawn for the period of 90 days specified in the Advertisement.

Contract Time

Time is of the essence in the performance of the work under this Contract. The available time for work under this Contract is indicated on page C-2, Article III of the Contract. If these time requirements can not be met, the Bidder must stipulate on Bid Form Section 3 - Time Alternate its schedule for performance of the work. Consideration will be given to time in evaluating bids.

Liquidated Damages

A liquidated damages clause, as given on page C-2, Article III of the Contract, provides that the Contractor shall pay the City as liquidated damages, and not as a penalty, a sum certain per day for each and every day that the Contractor may be in default of completion of the specified work, within the time(s) stated in the Contract, or written extensions.

Liquidated damages clauses, as given in the General Conditions, provide further that the City shall be entitled to impose and recover liquidated damages for breach of the obligations under Chapter 112 of the City Code.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

Human Rights Information

Section 5, beginning at page GC-3, outlines the requirements for fair employment practices under City of Ann Arbor Contracts. To establish compliance with this Ordinance, the Bidder should complete and return with its bid completed copies of the Human Rights Division Contract Compliance Forms or an acceptable equivalent. In the event Human Rights forms are not submitted with the bid, the bidder will have 24 hours to provide once requested by the City.

Wage Requirements

Section 4, beginning at page GC-2, outlines the requirements for payment of prevailing wages or of a “living wage” to employees providing service to the City under this contract. The successful bidder must comply with all applicable requirements and provide documentary proof of compliance when requested.

Major Subcontractors

The Bidder shall identify on Bid Form Section 4 each major subcontractor it expects to engage for this Contract if the work to be subcontracted is 15% or more of the bid sum or over $50,000, whichever is less. The Bidder also shall identify the work to be subcontracted to each major subcontractor. The Bidder shall not change or replace a subcontractor without approval by the City.

Debarment

Submission of a Bid in response to this ITB is certification that the Bidder is not currently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from participation in this transaction by any State or Federal departments or agency. Submission is also agreement that the City will be notified of any changes in this status.

Disclosures

After bids are opened, all information in a submitter's bid is subjected to disclosure under the provisions of Michigan Public Act No. 442 of 1976, as amended (MCL 15.231 et seq.) known as the "Freedom of Information Act." The Freedom of Information Act also provides for the complete disclosure of contracts and attachments thereto except where specifically exempted.

Bid Protest

All Bid protests must be in writing and filed with the Purchasing Agent within five (5) business days of the award action. The bidder must clearly state the reasons for the protest. If a bidder contacts a City Service Area/Unit and indicates a desire to protest an award, the Service Area/Unit shall refer the bidder to the Purchasing Agent. The Purchasing Agent will provide the bidder with the appropriate instructions for filing the protest. The protest shall be reviewed by the City Administrator or designee whose decision shall be final.

Reservation of Rights

The City of Ann Arbor reserves the right to accept any bid or alternative bid proposed in whole or in part, to reject any or all bids or alternatives bids in whole or in part and to waive irregularity and/or informalities in any bid and to make the award in any manner deemed in the best interest of the City.

City of Ann Arbor Procurement Office
INSTRUCTIONS FOR CONTRACTORS

For Completing CONTRACT COMPLIANCE FORM

City Policy

The "non discrimination in contracts" provision of the City Code, (Chapter 112, Section 9:161) requires contractors/bidders/grantees doing business with the City not to discriminate on the basis of actual or perceived race, color, religion, national origin, sex, age, condition of pregnancy, marital status, physical or mental limitations, source of income, family responsibilities, educational association, sexual orientation, gender identity or HIV status against any of their employees, any City employee working with them, or any applicant for employment. It also requires that the contractors/bidders/grantees include a similar provision in all subcontracts that they execute for City work or programs.

This Ordinance further requires that each prospective contractor/bidder submit employment data to the City showing current total employee breakdown by occupation, race and gender. This allows the Human Rights Office to determine whether or not the contractor/bidder has a workforce that is reflective of the availability of women and under-represented minorities within the contractor's labor recruitment area (the area where they can reasonably be expected to recruit employees). ***This data is provided to the City on the Human Rights Contract Compliance Forms (attached).***

To complete the form:

1) **If a company has more than one location, then that company must complete 2 versions of the form.**

- **Form #1** should contain the employment data for the **entire corporation**.
- **Form #2** should contain the employment data for those employees:
  - who will be working on-site;
  - in the office responsible for completing the contract; or,
  - in the case of non-profit grantees, those employees working on the project funded by the City grant(s).

2) If the company has only one location, fill out Form #1 only.

3) Complete all data in the upper section of the form including the name of the person who completes the form and the name of the company/organization's president.

4) Complete the Employment Data in the remainder of the form. Please be sure to complete all columns including the Total Columns on the far right side of the form, and the Total row and Previous Year Total row at the bottom of the form.

5) Return the completed form(s) to *your contact* in the City Department for whom you will be conducting the work.

For assistance in completing the form, contact:
Procurement Office of the City of Ann Arbor
(734) 794-6576

If a contractor is determined to be out of compliance, the Procurement Office will work with them to assist them in coming into compliance.

CITY OF ANN ARBOR HUMAN RIGHTS OFFICE

Form #1

CONTRACT COMPLIANCE FORM

Entire Organization (Totals for All Locations where applicable)

Name of Company/Organization_____ Date Form Completed_____

Name and Title of Person Completing this Form_____ Name of President _____

Address_____ County_____ Phone #_____
(Street address) (City) (State) (Zip) (Area Code)

Fax#_____ Email Address_____
(Area Code)

EMPLOYMENT DATA

Job Categories	**Number of Employees (Report employees in only one category)**												
	Male						**Female**						
	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaskan Native	**TOTAL COLUMNS A-L**
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	
Exec/Sr. Level Officials													
Supervisors													
Professionals													
Technicians													
Sales													
Admin. Support													
Craftspeople													
Operatives													
Service Workers													
Laborers/Helper													
Apprentices													
Other													
TOTAL													
PREVIOUS YEAR TOTAL													

Questions about this form? Call (734)794-6576

CITY OF ANN ARBOR HUMAN RIGHTS OFFICE

Form #2

CONTRACT COMPLIANCE FORM

Local Office (Only those employees that will do local or on-site work, if applicable)

Name of Company/Organization_____ Date Form Completed_____

Name and Title of Person Completing this Form_____ Name of President _____

Address_____ County_____ Phone #_____
(Street address) (City) (State) (Zip) (Area Code)

Fax#_____ Email Address_____
(Area Code)

EMPLOYMENT DATA

Job Categories	**Number of Employees (Report employees in only one category)**												
	Male						**Female**						
	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaskan Native	**TOTAL COLUMNS A-L**
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	
Exec/Sr. Level Officials													
Supervisors													
Professionals													
Technicians													
Sales													
Admin. Support													
Craftspeople													
Operatives													
Service Workers													
Laborers/Helper													
Apprentices													
Other													
TOTAL													
PREVIOUS YEAR TOTAL													

2/12

Questions about this form? Call 734-794-6576

CITY OF ANN ARBOR
LIVING WAGE ORDINANCE
DECLARATION OF COMPLIANCE

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that employers providing services to the City or recipients of grants for financial assistance (in amounts greater than $10,000 in a twelve-month period of time) pay their employees who are working on the City project or grant, a minimum level of compensation known as the Living Wage. This wage must be paid to the employees for the length of the contract/project.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from the Ordinance. If this exemption applies to your firm, please check below:

_____ This **company** is exempt due to the fact that we employ or contract with fewer than 5 individuals.

_____ This **non-profit agency** is exempt due to the fact that we employ or contract with fewer than 10 employees.

The Ordinance requires that all contractors/bidders and/or grantees agree to the following terms:

a) To pay each of its employees performing work on any covered contract or grant with the City, no less than the living wage, which is defined as $12.17/hour when health care is provided, or no less than $13.57/hour for those employers that do *not* provide health care. It is understood that the Living Wage will be adjusted each year on April 30, and covered employers will be required to pay the adjusted amount thereafter. The rates stated above include any adjustment for 2012.

b) Please check the boxes below which apply to your workforce:

☐ Employees who are assigned to *any covered* City project or grant will be paid at or above the applicable living wage without health benefits Yes_____ No_____

OR

☐ Employees who are assigned to *any covered* City project or grant will be paid at or above the applicable living wage with health benefits Yes_____ No_____

c) To post a notice approved by the City regarding the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.

d) To provide the City payroll records or other documentation as requested; and,

e) To permit access to work sites to City representatives for the purposes of monitoring compliance, investigating complaints or non-compliance.

The undersigned authorized representative hereby obligates the contractor/bidder or grantee to the above stated conditions under penalty of perjury and violation of the Ordinance.

Company Name	Address City State Zip
Signature of Authorized Representative	Phone (area code)
Type or Print Name and Title	Email address
Date signed	

Questions about this form? Please contact:
Procurement Office City of Ann Arbor
Phone: 734/794-6576

LW-2

Revised 3/2012

CITY OF ANN ARBOR
LIVING WAGE ORDINANCE

RATE EFFECTIVE MAY 1, 2012 - ENDING APRIL 30, 2013

$12.17 per hour
If the employer provides health care benefits*****

$13.57 per hour
If the employer does **NOT** provide health care benefits*****

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than $10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

ENFORCEMENT

The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than $500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

***** Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed $.50 an hour for an average work week; and the employer cost or contribution must equal no less than $1/hr for the average work week.

For Additional Information or to File a Complaint Contact:

Karen Lancaster, Procurement Officer
734/794-6500 or KLancaster@a2gov.org.

The Law Requires Employers to Display This Poster Where Employees Can Readily See It.

INVITATION TO BID

City of Ann Arbor
Guy C. Larcom Municipal Building
Ann Arbor, Michigan 48107

Ladies and Gentlemen:

The undersigned, as Bidder, declares that this Bid is made in good faith, without fraud or collusion with any person or persons bidding on the same Contract; that this Bidder has carefully read and examined the bid documents, including Advertisement, Human Rights Division Contract Compliance Forms, Notice of Pre-Bid Conference, Instructions to Bidders, Bid, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans and understands them. The Bidder declares that it conducted a full investigation at the site and of the work proposed and is fully informed as to the nature of the work and the conditions relating to the work's performance. The Bidder also declares that it has extensive experience in successfully completing projects similar to this one.

The Bidder acknowledges that it has not received or relied upon any representations or warrants of any nature whatsoever from the City of Ann Arbor, its agents or employees, and that this Bid is based solely upon the Bidder's own independent business judgment.

The undersigned proposes to perform all work shown on the plans or described in the bid documents, including any addenda issued, and to furnish all necessary machinery, tools, apparatus, and other means of construction to do all the work, furnish all the materials, and complete the work in strict accordance with all terms of the Contract of which this Bid is one part.

In accordance with these bid documents, and Addenda numbered _____, the undersigned, as Bidder, proposes to perform at the sites in and/or around Ann Arbor, Michigan, all the work included herein for the amounts set forth in the Bid Forms.

The Bidder declares that it has become fully familiar with the liquidated damage clauses for completion times and for compliance with City Code Chapter 112, understands and agrees that the liquidated damages are for the non-quantifiable aspects of non-compliance and do not cover actual damages that may be shown and agrees that if awarded the Contract, all liquidated damage clauses form part of the Contract.

The Bidder declares that it has become fully familiar with the provisions of Chapter 14, Section 1:319 (Prevailing wages) and Chapter 23 (Living Wage) of the Code of the City of Ann Arbor and that it understands and agrees to comply, to the extent applicable to employees providing services to the City under this Contract, with the wage and reporting

requirements stated in the City Code provisions cited. Bidder further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

The Bidder encloses a certified check or Bid Bond in the amount of 5% of the total of the Bid Price. The Bidder agrees both to contract for the work and to furnish the necessary Bonds and insurance documentation within 10 days after being notified of the acceptance of the Bid.

If this Bid is accepted by the City and the Bidder fails to contract and furnish the required Bonds and insurance documentation within 10 days after being notified of the acceptance of this Bid, then the Bidder shall be considered to have abandoned the Contract and the certified check or Bid Bond accompanying this Bid shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Bid, or if this Bid is rejected, then the accompanying check or Bid Bond shall be returned to the Bidder.

In submitting this Bid, it is understood that the right is reserved by the City to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

SIGNED THIS _____ DAY OF _____, 201__.

_____	_____
Bidder's Name	Authorized Signature of Bidder
_____	_____
Official Address	(Print Name of Signer Above)
_____	_____
Telephone Number	Email Address for Award Notice

LEGAL STATUS OF BIDDER

(The Bidder shall fill out the appropriate form and strike out the other two.)

Bidder declares that it is:

* A corporation organized and doing business under the laws of the state of _____, for whom _____, bearing the office title of_____, whose signature is affixed to this Bid, is authorized to execute contracts.

* A partnership, list all members and the street and mailing address of each:

Also identify the County and State where partnership papers are filed:

County of _____, State of

* An individual, whose signature with address, is affixed to this Bid: _____
(initial here)

BID FORM
Section 1 – Schedule of Prices

Project: Veterans Memorial Indoor Ice Arena Renovation
ITB No.: 4273

Bidder's Name: _____

Notes:
1. All bidders shall provide a Unit Price and Total Price for all bid items specified.
2. Quantities included in the bid table represent estimated quantities for different work. The CONTRACTOR shall be compensated for the actual number of items completed using the unit prices provided.
3. The City, at its sole discretion, may elect to delete any portion of the work delineated below, with no change to the unit prices provided. Work shall be determined based upon the availability of funds.
4. Any item not provided in the following list shall be considered incidental.
5. Contract shall be awarded based on the base bid or any combination of the base bid and alternate bid areas in any manner the City believes to be in its best interest.

Bid Items

The Bidder agrees to complete the Project and all related work, as specified and shown on the drawings, for the following unit prices.

BASE BID					
Item No.	**Item Description**	**Qty**	**Unit**	**Unit Price**	**Total Price**
1.	General Conditions, Insurance, Bonds, Mobilization	1	LS	$	$
2.	Roofing, Gutters and Downspouts	1	LS	$	$
3.	Frame and Purlin Improvements	1	LS	$	$
4.	Painting	1	LS	$	$
5.	Lead Based Paint Abatement	1	LS	$	$
6.	Lighting Controller	1	LS	$	$
7.	Demobilization and Project Close Out	1	LS	$	$
8.	Allowances – Miscellaneous Repairs and Permits	1	LS	$ 35,000	$
				TOTAL BASE BID (Items 1-8)	**$**

_____ Dollars ($_____)
(Amount shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.)

ALTERNATE BID					
Item No.	**Item Description**	**Qty**	**Unit**	**Unit Price**	**Total Price**
1.	Siding	1	LS	$	$
				TOTAL ALTERNATE BID (Item No. 1)	**$**

_____ Dollars ($_____)
(Amount shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.)

BID FORM

Section 2 - Material and Equipment Alternates

The Base Bid proposal price shall include materials and equipment selected from the designated items and manufacturers listed in the bidding documents. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the Contractor wishes to quote alternate items for consideration by the City, it may do so under this Section. A complete description of the item and the proposed price differential must be provided. Unless approved at the time of award, substitutions where items are specifically named will be considered only as a negotiated change in Contract Sum.

Item Number	Description	Add/Deduct Amount

If the Bidder does not suggest any material or equipment alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any material or equipment alternate under the Contract.

Signature of Authorized Representative of Bidder _____

BID FORM

Section 3 - Time Alternate

If the Bidder takes exception to the time stipulated in Article III of the Contract, Time of Completion, page C-2, it is requested to stipulate below its proposed time for performance of the work. Consideration will be given to time in evaluating bids.

If the Bidder does not suggest any time alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any time alternate under the Contract.

Signature of Authorized Representative of Bidder _____

BID FORM

Section 4 - Major Subcontractors

For purposes of this Contract, a Subcontractor is anyone (other than the Contractor) who performs work (other than or in addition to the furnishing of materials, plans or equipment) at or about the construction site, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of Contract with the Contractor), but shall not include any individual who furnishes merely the individual's own personal labor or services.

For the work outlined in these documents the Bidder expects to engage the following major subcontractors to perform the work identified:

Subcontractor (Name and Address)	Work	Amount
	Roofing Manufacturer	
	Electrical	
	Painting	
	Paint Testing Subcontractor	
	Other	

If the Bidder does not expect to engage any major subcontractor, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT expect to engage any major subcontractor to perform work under the Contract.

Signature of Authorized Representative of Bidder _____

BID FORM

Section 5 – References

GENERAL CONTRACTOR (Name: _____)

Include a minimum of three references from projects completed within the past ten years for major metal roofing projects at similar sized facilities. Provide documentation confirming that the firm is a certified installer of the specified roofing system.

Refer also to Instructions to Bidders and Specification Section 13120 for additional requirements.

1) _____ _____ _____
Project Name Cost Date Constructed

_____ _____
Contact Name Phone Number

2) _____ _____ _____
Project Name Cost Date Constructed

_____ _____
Contact Name Phone Number

3) _____ _____ _____
Project Name Cost Date Constructed

_____ _____
Contact Name Phone Number

CONTRACT

THIS AGREEMENT is made on the _____ day of _____, 2013, between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 301 East Huron Street, Ann Arbor, Michigan 48104 ("City") and _____ ("Contractor")

(An individual/partnership/corporation, include state of incorporation) (Address)

Based upon the mutual promises below, the Contractor and the City agree as follows:

ARTICLE I - Scope of Work

The Contractor agrees to furnish all of the materials, equipment and labor necessary; and to abide by all the duties and responsibilities applicable to it for the project titled "Veterans Memorial Indoor Ice Arena Renovation" in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, which are incorporated as part of this Contract:

Human Rights Division Contract
Living Wage Declaration of Compliance Forms (if applicable)
Bid Forms
Contract and Exhibits
Bonds
General Conditions
Standard Specifications
Detailed Specifications
Plans
Addenda

ARTICLE II - Definitions

Administering Service Area/Unit means Public Services Area.

Supervising Professional or Owner means persons acting under the authorization of the Administrator/Manager of the Administering Service Area/Unit.

Engineer or Owner's Representative means Consulting Professional acting under the authorization of the Supervising Professional/Owner.

Project means, Veterans Memorial Indoor Ice Arena Renovation, Bid No. ITB-4273

ARTICLE III - Time of Completion

(A) The work to be completed under this Contract shall begin immediately on the date specified in the Notice to Proceed issued by the City.

(B) The entire work for this Contract shall be completed within fifteen (15) consecutive weeks. Shorter completion times for certain portions of the work are specified below. Liquidated damages shall also apply to these intermediate milestones.

Intermediate Milestones

(i) Shop Drawings and field measurements shall be prepared and submitted within two (2) consecutive weeks following the Notice to Proceed.

(ii) Fabrication and delivery shall be completed within six (6) consecutive weeks following approved shop drawings.

(iii) Installation and construction of all improvements shall be completed within five (5) consecutive weeks following delivery.

(iv) All interior work must be performed between June 1, 2013 and August 15, 2013.

(C) Failure to complete all the work within the time specified above, including any extension granted in writing by the Supervising Professional, shall obligate the Contractor to pay the City, as liquidated damages and not as a penalty, an amount equal to $500.00 for each calendar day of delay in the completion of all the work. If any liquidated damages are unpaid by the Contractor, the City shall be entitled to deduct these unpaid liquidated damages from the monies due the Contractor.

As an independent requirement, where the Detailed Specifications or Plans identify certain portions of the work to be completed within a shorter period of time and the Contractor fails to complete each portion within the shorter period specified for each portion, including any extension granted in writing by the Project Supervisor, the City is entitled to deduct from the monies due the Contractor, as liquidated damages and not as a penalty, the amount equal to that identified in Specification Section 01140, Table 1 for each portion or Phase of the work not timely completed for each calendar day of delay in completion of each portion of the work.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

Liquidated damages under this section are in addition to any liquidated damages due under Section 5 of the General Conditions.

ARTICLE IV - The Contract Sum

(A) The City shall pay to the Contractor for the performance of the Contract, the unit prices as given in the Bid Forms for the estimated bid total of:

_____Dollars ($_____)

(B) The amount paid shall be equitably adjusted to cover changes in the work ordered by the Supervising Professional but not required by the Contract Documents. Increases or decreases shall be determined only by written agreement between the City and Contractor.

ARTICLE V - Assignment

This Contract may not be assigned or subcontracted without the written consent of the City.

ARTICLE VI - Choice of Law

This Contract shall be construed, governed, and enforced in accordance with the laws of the State of Michigan. By executing this agreement, the Contractor and the City agree to venue in a court of appropriate jurisdiction sitting within Washtenaw County for purposes of any action arising under this Contract. The parties stipulate that the venue referenced in this Contract is for convenience and waive any claim of non-convenience.

Whenever possible, each provision of the Contract will be interpreted in a manner as to be effective and valid under applicable law. The prohibition or invalidity, under applicable law, of any provision will not invalidate the remainder of the Contract.

ARTICLE VII - Relationship of the Parties

The parties of the Contract agree that it is not a Contract of employment but is a Contract to accomplish a specific result. Contractor is an independent Contractor performing services for the City. Nothing contained in this Contract shall be deemed to constitute any other relationship between the City and the Contractor.

Contractor certifies that it has no personal or financial interest in the project other than the compensation it is to receive under the Contract. Contractor certifies that it is not, and shall not become, overdue or in default to the City for any Contract, debt, or any other obligation to the City including real or personal property taxes. City shall have the right to set off any such debt against compensation awarded for services under this agreement.

ARTICLE VIII - Notice

All notices given under this Contract shall be in writing, and shall be by personal delivery or by certified mail with return receipt requested to the parties at their respective addresses as specified in the Contract Documents or other address the Contractor may specify in writing.

ARTICLE IX - Indemnification

To the fullest extent permitted by law, Contractor shall indemnify, defend and hold harmless the City, its officers, employees and agents harmless from all suits, claims, judgments and expenses including attorney's fees resulting or alleged to result, in whole or in part, from any act or omission, which is in any way connected or associated with this Contract, by the Contractor or anyone acting on the Contractor's behalf under this Contract. Contractor shall not be responsible to indemnify the City for losses or damages caused by or resulting from the City's sole negligence.

ARTICLE X - Entire Agreement

This Contract represents the entire understanding between the City and the Contractor and it supersedes all prior representations or agreements whether written or oral. Neither party has relied on any prior representations in entering into this Contract. This Contract may be altered, amended or modified only by written amendment signed by the City and the Contractor.

FOR CONTRACTOR

By_____
Its:_____

FOR THE CITY OF ANN ARBOR

By_____
John Hieftje, Mayor

By_____
Jacqueline Beaudry, City Clerk

Approved as to substance

By_____
Steven D. Powers, City Administrator

By_____
Craig Hupy, Public Services
Area Administrator

Approved as to form and content

_____
Stephen K. Postema, City Attorney

PERFORMANCE BOND

(1) _____ of _____ (referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for

$ _____, the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.

(2) The Principal has entered a written Contract with the City dated _____, 2013, for: _____ _____ and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq.

(3) Whenever the Principal is declared by the City to be in default under the Contract, the Surety may promptly remedy the default or shall promptly:

(a) complete the Contract in accordance with its terms and conditions; or

(b) obtain a bid or bids for submission to the City for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, arrange for a Contract between such bidder and the City, and make available, as work progresses, sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in paragraph 1.

(4) Surety shall have no obligation to the City if the Principal fully and promptly performs under the Contract.

(5) Surety agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the specifications accompanying it shall in any way affect its obligations on this bond, and waives notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work, or to the specifications.

SIGNED AND SEALED this _____ day of _____, 2013.

_____
(Name of Surety Company)

By _____
(Signature)

Its _____
(Title of Office)

_____
(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Approved as to form:

_____
Stephen K. Postema, City Attorney

Name and address of agent:

_____

_____

_____

LABOR AND MATERIAL BOND

(1) _____

of _____(referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan, (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for the use and benefit of claimants as defined in Act 213 of Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq., in the amount of $ _____, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.

(2) The Principal has entered a written Contract with the City, dated _____, 2013, for _____ _____ _____; and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963 as amended;

(3) If the Principal fails to promptly and fully repay claimants for labor and material reasonably required under the Contract, the Surety shall pay those claimants.

(4) Surety's obligations shall not exceed the amount stated in paragraph 1, and Surety shall have no obligation if the Principal promptly and fully pays the claimants.

SIGNED AND SEALED this _____ day of _____, 2013.

_____
(Name of Surety Company)

By _____
(Signature)

Its _____
(Title of Office)

_____
(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Approved as to form:

_____
Stephen K. Postema, City Attorney

Name and address of agent:

_____

_____

_____

GENERAL CONDITIONS

Section 1 - Execution, Correlation and Intent of Documents

The contract documents shall be signed in 2 copies by the City and the Contractor.

The contract documents are complementary and what is called for by any one shall be binding. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work. Materials or work described in words which so applied have a well-known technical or trade meaning have the meaning of those recognized standards.

In case of a conflict among the contract documents listed below in any requirement(s), the requirement(s) of the document listed first shall prevail over any conflicting requirement(s) of a document listed later.

(1) Addenda in reverse chronological order; (2) Detailed Specifications; (3) Standard Specifications; (4) Plans; (5) General Conditions; (6) Contract; (7) Bid Forms; (8) Bond Forms; (9) Bid.

Section 2 - Order of Completion

The Contractor shall submit with each invoice, and at other times reasonably requested by the Supervising Professional, schedules showing the order in which the Contractor proposes to carry on the work. They shall include the dates at which the Contractor will start the several parts of the work, the estimated dates of completion of the several parts, and important milestones within the several parts.

Section 3 - Familiarity with Work

The Bidder or its representative shall make personal investigations of the site of the work and of existing structures and shall determine to its own satisfaction the conditions to be encountered, the nature of the ground, the difficulties involved, and all other factors affecting the work proposed under this Contract. The Bidder to whom this Contract is awarded will not be entitled to any additional compensation unless conditions are clearly different from those which could reasonably have been anticipated by a person making diligent and thorough investigation of the site.

The Bidder shall immediately notify the City upon discovery, and in every case prior to submitting its Bid, of every error or omission in the bidding documents that would be identified by a reasonably competent, diligent Bidder. In no case will a Bidder be allowed the benefit of extra compensation or time to complete the work under this Contract for extra expenses or time spent as a result of the error or omission.

Under this Contract, the Contractor shall conform to Chapter 14 of Title I of the Code of the City of Ann Arbor as amended; which in part states "...that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. At the request of the City, any contractor or subcontractor shall provide satisfactory proof of compliance with the contract provisions required by the Section."

Where the Contract and the Ann Arbor City Ordinance are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used.

Further, to the extent that any employees of the Contractor providing services under this contract are not part of the class of craftsmen, mechanics and laborers who receive a prevailing wage in conformance with Section 1:319 of Chapter 14 of Title I of the Code of the City of Ann Arbor, the Contractor agrees to conform to Chapter 23 of Title I of the Code of the City of Ann Arbor, as amended, which in part states:

1:814. Applicability.

(1) This Chapter shall apply to any person that is a contractor/bidder or grantee as defined in Section 1:813 that employs or contracts with five (5) or more individuals; provided, however, that this Chapter shall not apply to a non-profit contractor/bidder or non-profit grantee unless it employs or contracts with ten (10) or more individuals.

(2) This Chapter shall apply to any grant, contract, or subcontract or other form of financial assistance awarded to or entered into with a contractor/bidder or grantee after the effective date of this Chapter and to the extension or renewal after the effective date of this Chapter of any grant, contract, or subcontract or other form of financial assistance with a contractor/bidder or grantee.

1:815. Living Wages Required.

(1) Every contractor/bidder or grantee, as defined in Section 1:813, shall pay its covered employees a living wage as established in this Section.

(a) For a covered employer that provides employee health care to its employees, the living wage shall be $9.42 an hour, or the adjusted amount hereafter established under Section 1:815(3).

(b) For a covered employer that does not provide health care to its employees, the living wage shall be $10.91 an hour, or the adjusted amount hereafter established under Section 1:815(3).

(2) In order to qualify to pay the living wage rate for covered employers providing employee health care under subsection 1:815(1)(a), a covered employer shall furnish proof of said health care coverage and payment therefor to the City Administrator or his/her designee.

(3) The amount of the living wage established in this Section shall be adjusted upward no later than April 30, 2002, and every year thereafter by a percentage equal to the percentage increase, if any, in the federal poverty guidelines as published by the United States Department of Health and Human Services for the years 2001 and 2002. Subsequent annual adjustments shall be based upon the percentage increase, if any, in the United States Department of Health and Human Services poverty guidelines when comparing the prior calendar year's poverty guidelines to the present calendar year's guidelines. The applicable percentage amount will be converted to an amount in cents by multiplying the existing wage under Section 1.815(1)(b) by said percentage, rounding upward to the next cent, and adding this amount of cents to the existing living wage levels established under Sections 1:815(1)(a) and 1:815(1)(b). Prior to April 1 of each calendar year, the City will notify any covered employer of this adjustment by posting a written notice in a prominent place in City Hall, and, in the case of a covered employer that has provided an address of record to the City, by a written letter to each such covered employer.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision covering subcontractor's employees who perform work on this contract.

Section 5 - Non-Discrimination

The Contractor agrees to comply, and to require its subcontractor(s) to comply, with the nondiscrimination provisions of Section 209 of the Elliot-Larsen Civil Rights Act (MCL 37.2209). The Contractor further agrees to comply with the nondiscrimination provisions of Chapter 112 of the Ann Arbor City Code and to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity. The Contractor further agrees to comply with the provisions of Section 9:161 of Chapter 112 of the Ann Arbor City Code and in particular the following excerpts:

9:161 NONDISCRIMINATION BY CITY CONTRACTORS

(1) All Contractors proposing to do business with the City of Ann Arbor shall satisfy the nondiscrimination administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All contractors shall receive approval from the Director prior to entering into a contract with the City, unless specifically exempted by administrative policy. All City contractors shall take affirmative action to insure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon race, national origin or sex.

(2) Each prospective contractor shall submit to the City data showing current total employment by occupational category, sex and minority group. If, after verifying this data, the Director concludes that it indicates total minority and female employment commensurate with their availability within the contractor's labor recruitment area, i.e., the area from which the Contractor can reasonably be expected to recruit, said Contractor shall be accepted by the

Director as having fulfilled affirmative action requirements for a period of one year at which time the Director shall conduct another review. Other Contractors shall develop an affirmative action program in conjunction with the Director. Said program shall include specific goals and timetables for the hiring and promotion of minorities and females. Said goals shall reflect the availability of minorities and females within the contractor's labor recruitment area. In the case of Construction Contractors, the Director shall use for employment verification the labor recruitment area of the Ann Arbor-Ypsilanti standard metropolitan statistical area. Construction Contractors determined to be in compliance shall be accepted by the Director as having fulfilled affirmative action requirements for a period of six (6) months at which time the Director shall conduct another review.

(3) In hiring for construction projects, Contractors shall make good faith efforts to employ local persons, so as to enhance the local economy.

(4) All Contracts shall include provisions through which the Contractor agrees, in addition to any other applicable Federal or State labor laws:

(a) To set goals, in conference with the Human Resources Director, for each job category or division of the work force used in the completion of the City work;

(b) To provide periodic reports concerning the progress the contractor has made in meeting the affirmative action goals it has agreed to;

(c) To permit the Director access to all books, records and accounts pertaining to its employment practices for the purpose of determining compliance with the affirmative action requirements.

(5) The Director shall monitor the compliance of each contractor with the nondiscrimination provisions of each Contract. The Director shall develop procedures and regulations consistent with the administrative policy adopted by the City Administrator for notice and enforcement of non-compliance. Such procedures and regulations shall include a provision for the posting of contractors not in compliance.

(6) All City Contracts shall provide further that breach of the obligation not to discriminate shall be a material breach of the contract for which the City shall be entitled, at its option, to do any or all of the following:

(a) To cancel, terminate, or suspend the contract in whole or part and/or refuse to make any required periodic payments under the contract;

(b) Declare the contractor ineligible for the award of any future contracts with the City for a specified length of time;

(c) To recover liquidated damages of a specified sum, said sum to be that percentage of the labor expenditure for the time period involved which would have accrued to minority group members had the affirmative action not been breached;

(d) Impose for each day of non-compliance, liquidated damages of a specified sum, based upon the following schedule:

Contract Amount	Assessed Damages Per Day of Non-Compliance
$ 10,000 - 24,999	$ 25.00
25,000 - 99,999	50.00
100,000 - 199,999	100.00
200,000 - 499,999	150.00
500,000 - 1,499,999	200.00
1,500,000 - 2,999,999	250.00
3,000,000 - 4,999,999	300.00
5,000,000 - and above	500.00

(e) In addition the contractor shall be liable for any costs or expenses incurred by the City of Ann Arbor in obtaining from other sources the work and services to be rendered or performed or the goods or properties to be furnished or delivered to the City under this contract.

Section 6 - Materials, Appliances, Employees

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary or used for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and materials shall be of the highest quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor shall at all times enforce strict discipline and good order among its employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned.

Adequate sanitary facilities shall be provided by the Contractor.

Section 7 - Qualifications for Employment

The Contractor shall employ competent laborers and mechanics for the work under this Contract. For work performed under this Contract, employment preference shall be given to qualified local residents.

Section 8 - Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringements of any patent rights and shall hold the City harmless from loss on account of infringement except that the City shall be responsible for all infringement loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the City has notified the Contractor prior to the signing of the Contract that the particular process or product is patented or is believed to be patented.

Section 9 - Permits and Regulations

The Contractor must secure and pay for all permits, permit or plan review fees and licenses necessary for the prosecution of the work. These include but are not limited to City building permits, right-of-way permits, lane closure permits, right-of-way occupancy permits, and the like. The City shall secure and pay for easements shown on the plans unless otherwise specified.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the contract documents are at variance with those requirements, it shall promptly notify the Supervising Professional in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

Section 10 - Protection of the Public and of Work and Property

The Contractor is responsible for the means, methods, sequences, techniques and procedures of construction and safety programs associated with the work contemplated by this contract. The Contractor, its agents or sub-contractors, shall comply with the "General Rules and Regulations for the Construction Industry" as published by the Construction Safety Commission of the State of Michigan and to all other local, State and National laws, ordinances, rules and regulations pertaining to safety of persons and property.

The Contractor shall take all necessary and reasonable precautions to protect the safety of the public. It shall continuously maintain adequate protection of all work from damage, and shall take all necessary and reasonable precautions to adequately protect all public and private property from injury or loss arising in connection with this Contract. It shall make good any damage, injury or loss to its work and to public and private property resulting from lack of reasonable protective precautions, except as may be due to errors in the contract documents, or caused by agents or employees of the City. The Contractor shall obtain and maintain sufficient insurance to cover damage to any City property at the site by any cause.

In an emergency affecting the safety of life, or the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Supervising Professional, permitted to act at its discretion to prevent the threatened loss or injury. It shall also so act, without appeal, if authorized or instructed by the Supervising Professional.

Any compensation claimed by the Contractor for emergency work shall be determined by agreement or in accordance with the terms of Claims for Extra Cost - Section 15.

Section 11 - Inspection of Work

The City shall provide sufficient competent personnel for the inspection of the work.

The Supervising Professional shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for access and for inspection.

If the specifications, the Supervising Professional's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Supervising Professional timely notice of its readiness for inspection, and if the inspection is by an

authority other than the Supervising Professional, of the date fixed for the inspection. Inspections by the Supervising Professional shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Supervising Professional, it must, if required by the Supervising Professional, be uncovered for examination and properly restored at the Contractor's expense.

Re-examination of any work may be ordered by the Supervising Professional, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to be in accordance with the contract documents, the City shall pay the cost of re-examination and replacement. If the work is not in accordance with the contract documents, the Contractor shall pay the cost.

Section 12 - Superintendence

The Contractor shall keep on the work site, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Supervising Professional. The superintendent will be responsible to perform all on-site project management for the Contractor. The superintendent shall be experienced in the work required for this Contract. The superintendent shall represent the Contractor and all direction given to the superintendent shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other directions will be confirmed on written request. The Contractor shall give efficient superintendence to the work, using its best skill and attention.

Section 13 - Changes in the Work

The City may make changes to the quantities of work within the general scope of the Contract at any time by a written order and without notice to the sureties. If the changes add to or deduct from the extent of the work, the Contract Sum shall be adjusted accordingly. All the changes shall be executed under the conditions of the original Contract except that any claim for extension of time caused by the change shall be adjusted at the time of ordering the change.

In giving instructions, the Supervising Professional shall have authority to make minor changes in the work not involving extra cost and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Supervising Professional, and no claim for an addition to the Contract Sum shall be valid unless the additional work was ordered in writing.

The Contractor shall proceed with the work as changed and the value of the work shall be determined as provided in Claims for Extra Cost - Section 15.

Section 14 - Extension of Time

Extension of time stipulated in the Contract for completion of the work will be made if and as the Supervising Professional may deem proper under any of the following circumstances:

(1) When work under an extra work order is added to the work under this Contract;

(2) When the work is suspended as provided in Section 20;

(3) When the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, and which were not the result of its fault or negligence;

(4) Delays in the progress of the work caused by any act or neglect of the City or of its employees or by other Contractors employed by the City;

(5) Delay due to an act of Government;

(6) Delay by the Supervising Professional in the furnishing of plans and necessary information;

(7) Other cause which in the opinion of the Supervising Professional entitles the Contractor to an extension of time.

The Contractor shall notify the Supervising Professional within 7 days of an occurrence or conditions which, in the Contractor's opinion, entitle it to an extension of time. The notice shall be in writing and submitted in ample time to permit full investigation and evaluation of the Contractor's claim. The Supervising Professional shall acknowledge receipt of the Contractor's notice within 7 days of its receipt. Failure to timely provide the written notice shall constitute a waiver by the Contractor of any claim.

In situations where an extension of time in contract completion is appropriate under this or any other section of the contract, the Contractor understands and agrees that the only available adjustment for events that cause any delays in contract completion shall be extension of the required time for contract completion and that there shall be no adjustments in the money due the Contractor on account of the delay.

Section 15 - Claims for Extra Cost

If the Contractor claims that any instructions by drawings or other media issued after the date of the Contract involved extra cost under this Contract, it shall give the Supervising Professional written notice within 7 days after the receipt of the instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property. The procedure shall then be as provided for Changes in the Work-Section l3. No claim shall be valid unless so made.

If the Supervising Professional orders, in writing, the performance of any work not covered by the contract documents, and for which no item of work is provided in the Contract, and for which no unit price or lump sum basis can be agreed upon, then the extra work shall be done on a Cost-Plus-Percentage basis of payment as follows:

(1) The Contractor shall be reimbursed for all reasonable costs incurred in doing the work, and shall receive an additional payment of 15% of all the reasonable costs to cover both its indirect overhead costs and profit;

(2) The term "Cost" shall cover all payroll charges for employees and supervision required under the specific order, together with all worker's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same; the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at agreed upon rates, together with cost of fuel and supply charges

for the equipment; and any costs incurred by the Contractor as a direct result of executing the order, if approved by the Supervising Professional;

(3) If the extra is performed under subcontract, the subcontractor shall be allowed to compute its charges as described above. The Contractor shall be permitted to add an additional charge of 5% percent to that of the subcontractor for the Contractor's supervision and contractual responsibility;

(4) The quantities and items of work done each day shall be submitted to the Supervising Professional in a satisfactory form on the succeeding day, and shall be approved by the Supervising Professional and the Contractor or adjusted at once;

(5) Payments of all charges for work under this Section in any one month shall be made along with normal progress payments. Retainage shall be in accordance with Progress Payments-Section 16.

No additional compensation will be provided for additional equipment, materials, personnel, overtime or special charges required to perform the work within the time requirements of the Contract.

When extra work is required and no suitable price for machinery and equipment can be determined in accordance with this Section, the hourly rate paid shall be 1/40 of the basic weekly rate listed in the Rental Rate Blue Book published by Dataquest Incorporated and applicable to the time period the equipment was first used for the extra work. The hourly rate will be deemed to include all costs of operation such as bucket or blade, fuel, maintenance, "regional factors", insurance, taxes, and the like, but not the costs of the operator.

Section 16 - Progress Payments

The Contractor shall submit each month, or at longer intervals, if it so desires, an invoice covering work performed for which it believes payment, under the Contract terms, is due. The submission shall be to the City's Finance Department - Accounting Division. The Supervising Professional will, within 10 days following submission of the invoice, prepare a certificate for payment for the work in an amount to be determined by the Supervising Professional as fairly representing the acceptable work performed during the period covered by the Contractor's invoice. To insure the proper performance of this Contract, the City will retain a percentage of the estimate in accordance with Act 524, Public Acts of 1980. The City will then, following the receipt of the Supervising Professional's Certificate, make payment to the Contractor as soon as feasible, which is anticipated will be within 15 days.

An allowance may be made in progress payments if substantial quantities of permanent material have been delivered to the site but not incorporated in the completed work if the Contractor, in the opinion of the Supervising Professional, is diligently pursuing the work under this Contract. Such materials shall be properly stored and adequately protected. Allowance in the estimate shall be at the invoice price value of the items. Notwithstanding any payment of any allowance, all risk of loss due to vandalism or any damages to the stored materials remains with the Contractor.

In the case of Contracts which include only the Furnishing and Delivering of Equipment, the payments shall be; 60% of the Contract Sum upon the delivery of all equipment to be furnished, or in the case of delivery of a usable portion of the equipment in advance of the total equipment delivery,

60% of the estimated value of the portion of the equipment may be paid upon its delivery in advance of the time of the remainder of the equipment to be furnished; 30% of the Contract Sum upon completion of erection of all equipment furnished, but not later than 60 days after the date of delivery of all of the equipment to be furnished; and payment of the final 10% on final completion of erection, testing and acceptance of all the equipment to be furnished; but not later than l80 days after the date of delivery of all of the equipment to be furnished, unless testing has been completed and shows the equipment to be unacceptable.

With each invoice for periodic payment, the Contractor shall enclose a Contractor's Declaration - Section 43, and an updated project schedule per Order of Completion - Section 2.

Section 17 - Deductions for Uncorrected Work

If the Supervising Professional decides it is inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

Section 18 - Correction of Work Before Final Payment

The Contractor shall promptly remove from the premises all materials condemned by the Supervising Professional as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement.

If the Contractor does not remove the condemned work and materials within l0 days after written notice, the City may remove them and, if the removed material has value, may store the material at the expense of the Contractor. If the Contractor does not pay the expense of the removal within 10 days thereafter, the City may, upon 10 days written notice, sell the removed materials at auction or private sale and shall pay to the Contractor the net proceeds, after deducting all costs and expenses that should have been borne by the Contractor. If the removed material has no value, the Contractor must pay the City the expenses for disposal within 10 days of invoice for the disposal costs.

The inspection or lack of inspection of any material or work pertaining to this Contract shall not relieve the Contractor of its obligation to fulfill this Contract and defective work shall be made good. Unsuitable materials may be rejected by the Supervising Professional notwithstanding that the work and materials have been previously overlooked by the Supervising Professional and accepted or estimated for payment or paid for. If the work or any part shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good the defect in a manner satisfactory to the Supervising Professional. The judgment and the decision of the Supervising Professional as to whether the materials supplied and the work done under this Contract comply with the requirements of the Contract shall be conclusive and final.

Section 19 - Acceptance and Final Payment

Upon receipt of written notice that the work is ready for final inspection and acceptance, the Supervising Professional will promptly make the inspection. When the Supervising Professional finds the work acceptable under the Contract and the Contract fully performed, the Supervising Professional will promptly sign and issue a final certificate stating that the work required by this Contract has been completed and is accepted by the City under the terms and conditions of the Contract. The entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the City within 30 days after the date of the final certificate.

Before issuance of final certificates, the Contractor shall file with the City:

(1) The consent of the surety to payment of the final estimate;
(2) The Contractor's Affidavit in the form required by Section 44.

In case the Affidavit or consent is not furnished, the City may retain out of any amount due the Contractor, sums sufficient to cover all lienable claims.

The making and acceptance of the final payment shall constitute a waiver of all claims by the City except those arising from:

(1) unsettled liens;
(2) faulty work appearing within 12 months after final payment;
(3) hidden defects in meeting the requirements of the plans and specifications;
(4) manufacturer's guarantees.

It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

Section 20 - Suspension of Work

The City may at any time suspend the work, or any part by giving 5 days notice to the Contractor in writing. The work shall be resumed by the Contractor within 10 days after the date fixed in the written notice from the City to the Contractor to do so. The City shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of the suspension.

If the work, or any part, shall be stopped by the notice in writing, and if the City does not give notice in writing to the Contractor to resume work at a date within 90 days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work suspended and will be entitled to the estimates and payments for all work done on the portions abandoned, if any, plus 10% of the value of the work abandoned, to compensate for loss of overhead, plant expense, and anticipated profit.

Section 21 - Delays and the City's Right to Terminate Contract

If the Contractor refuses or fails to prosecute the work, or any separate part of it, with the diligence required to insure completion, ready for operation, within the allowable number of consecutive calendar days specified plus extensions, or fails to complete the work within the required time, the City may, by written notice to the Contractor, terminate its right to proceed with the work or any part of the work as to which there has been delay. After providing the notice the City may take over the work and prosecute it to completion, by contract or otherwise, and the Contractor and its sureties shall be liable to the City for any excess cost to the City. If the Contractor's right to proceed is terminated, the City may take possession of and utilize in completing the work, any materials, appliances and plant as may be on the site of the work and useful for completing the work. The right of the Contractor to proceed shall not be terminated or the Contractor charged with liquidated damages where an extension of time is granted under Extension of Time - Section 14.

If the Contractor is adjudged a bankrupt, or if it makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it fails to make prompt payments to subcontractors or for material or labor, or persistently disregards laws, ordinances or the instructions of the Supervising Professional, or otherwise is guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Supervising Professional that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor 3 days written notice, terminate this Contract. The City may then take possession of the premises and of all materials, tools and appliances thereon and without prejudice to any other remedy it may have, make good the deficiencies or finish the work by whatever method it may deem expedient, and deduct the cost from the payment due the Contractor. The Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of finishing the work, including compensation for additional managerial and administrative services exceeds the unpaid balance of the Contract Sum, the Contractor and its surety are liable to the City for any excess cost incurred. The expense incurred by the City, and the damage incurred through the Contractor's default, shall be certified by the Supervising Professional.

Section 22 - Contractor's Right to Terminate Contract

If the work should be stopped under an order of any court, or other public authority, for a period of 3 months, through no act or fault of the Contractor or of anyone employed by it, then the Contractor may, upon 7 days written notice to the City, terminate this Contract and recover from the City payment for all acceptable work executed plus reasonable profit.

Section 23 - City's Right To Do Work

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the City, 3 days after giving written notice to the Contractor and its surety may, without prejudice to any other remedy the City may have, make good the deficiencies and may deduct the cost from the payment due to the Contractor.

Section 24 - Removal of Equipment and Supplies

In case of termination of this Contract before completion, from any or no cause, the Contractor, if notified to do so by the City, shall promptly remove any part or all of its equipment and supplies from the property of the City, failing which the City shall have the right to remove the equipment and supplies at the expense of the Contractor.

The removed equipment and supplies may be stored by the City and, if all costs of removal and storage are not paid by the Contractor within 10 days of invoicing, the City upon 10 days written notice may sell the equipment and supplies at auction or private sale, and shall pay the Contractor the net proceeds after deducting all costs and expenses that should have been borne by the Contractor and after deducting all amounts claimed due by any lien holder of the equipment or supplies.

Section 25 - Responsibility for Work and Warranties

The Contractor assumes full responsibility for any and all materials and equipment used in the construction of the work and may not make claims against the City for damages to materials and equipment from any cause except negligence or willful act of the City. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the project (except for any part covered by Partial Completion and Acceptance - Section 26). The Contractor shall make good all work damaged or destroyed before acceptance. All risk of loss remains with the Contractor until final acceptance of the work (Section 19) or partial acceptance (Section 26). The Contractor is advised to investigate obtaining its own builders risk insurance.

The Contractor shall guarantee the quality of the work for a period of one year. The Contractor shall also unconditionally guarantee the quality of all equipment and materials that are furnished and installed under the contract for a period of one year. At the end of one year after the Contractor's receipt of final payment, the complete work, including equipment and materials furnished and installed under the contract, shall be inspected by the Contractor and the Supervising Professional. Any defects shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. Any defects that are identified prior to the end of one year shall also be inspected by the Contractor and the Supervising Professional and shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days.

The Contractor shall assign all manufacturer or material supplier warranties to the City prior to final payment. The assignment shall not relieve the Contractor of its obligations under this paragraph to correct defects.

Section 26 - Partial Completion and Acceptance

If at any time prior to the issuance of the final certificate referred to in Acceptance and Final Payment - Section 19, any portion of the permanent construction has been satisfactorily completed, and if the Supervising Professional determines that portion of the permanent construction is not required for the operations of the Contractor but is needed by the City, the Supervising Professional shall issue to the Contractor a certificate of partial completion, and immediately the City may take over and use the portion of the permanent construction described in the certificate, and exclude the Contractor from that portion.

The issuance of a certificate of partial completion shall not constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if the

Contractor has failed to complete it in accordance with the terms of this Contract. The issuance of the certificate shall not release the Contractor or its sureties from any obligations under this Contract including bonds.

If prior use increases the cost of, or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Supervising Professional may determine.

Section 27 - Payments Withheld Prior to Final Acceptance of Work

The City may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any certificate to the extent reasonably appropriate to protect the City from loss on account of:

(1) Defective work not remedied;

(2) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor;

(3) Failure of the Contractor to make payments properly to subcontractors or for material or labor;

(4) Damage to another Contractor.

When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the City which will protect the City in the amount withheld, payment shall be made for amounts withheld under this section.

Section 28 - Contractor's Insurance

A. The Contractor shall procure and maintain during the life of this Contract, including the guarantee period and during any warranty work, such insurance policies, including those set forth below, as will protect itself and the City from all claims for bodily injuries, death or property damage which may arise under this Contract; whether the acts were made by the Contractor or by any subcontractor or anyone employed by them directly or indirectly. The following insurance policies are required:

1. Worker's Compensation Insurance in accordance with all applicable state and federal statutes. Further, Employers Liability Coverage shall be obtained in the following minimum amounts:

   Bodily Injury by Accident - $500,000 each accident
   Bodily Injury by Disease - $500,000 each employee
   Bodily Injury by Disease - $500,000 each policy limit

2. Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 07 98. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements including, but not limited to: Products and Completed Operations, Explosion, Collapse and Underground coverage or Pollution. Further, the following minimum limits of liability are required:

$1,000,000 Each occurrence as respect Bodily Injury Liability or Property Damage Liability, or both combined.

$2,000,000 Per Job General Aggregate

$1,000,000 Personal and Advertising Injury

$2,000,000 Products and Completed Operations Aggregate

3. Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 07 97. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. Further, the limits of liability shall be $1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

4. Umbrella/Excess Liability Insurance shall be provided to apply excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of $1,000,000.

B. Insurance required under Section A.2 and A.3 of this Contract shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Further, the Contractor agrees to waive any right of recovery by its insurer against the City.

C. In the case of all Contracts involving on-site work, the Contractor shall provide to the City before the commencement of any work under this Contract documentation demonstrating it has obtained the above mentioned policies. Documentation must provide and demonstrate an unconditional 30 day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number; name of insurance company; name and address of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which shall be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified. An original certificate of insurance may be provided as an initial indication of the required insurance, provided that no later than 21 calendar days after commencement of any work the Contractor supplies a copy of the endorsements required on the policies. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) to the City. If any of the above coverages expire by their terms during the term of this Contract, the Contractor shall deliver proof of renewal and/or new policies to the Administering Service Area/Unit at least ten days prior to the expiration date.

D. Any Insurance provider of Contractor shall be admitted and authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company's Key Rating Guide of "A-" Overall and a minimum Financial Size Category of "V". Insurance policies and certificates issued by non-admitted insurance companies are not acceptable unless approved in writing by the City.

Section 29 - Surety Bonds

Bonds will be required from the successful bidder as follows:

(1) A Performance Bond to the City of Ann Arbor for the amount of the bid(s) accepted;
(2) A Labor and Material Bond to the City of Ann Arbor for the amount of the bid(s) accepted.

Bonds shall be executed on forms supplied by the City in a manner and by a Surety Company satisfactory to the City Attorney.

Section 30 - Damage Claims

The Contractor shall be held responsible for all damages to property of the City or others, caused by or resulting from the negligence of the Contractor, its employees, or agents during the progress of or connected with the prosecution of the work, whether within the limits of the work or elsewhere. The Contractor must restore all property injured including sidewalks, curbing, sodding, pipes, conduit, sewers or other public or private property to not less than its original condition with new work.

Section 31 - Refusal to Obey Instructions

If the Contractor refuses to obey the instructions of the Supervising Professional, the Supervising Professional shall withdraw inspection from the work, and no payments will be made for work performed thereafter nor may work be performed thereafter until the Supervising Professional shall have again authorized the work to proceed.

Section 32 - Assignment

Neither party to the Contract shall assign the Contract without the written consent of the other. The Contractor may assign any monies due to it to a third party acceptable to the City.

Section 33 - Rights of Various Interests

Whenever work being done by the City's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Supervising Professional, to secure the completion of the various portions of the work in general harmony.

The Contractor is responsible to coordinate all aspects of the work, including coordination of, and with, utility companies and other contractors whose work impacts this project.

Section 34 - Subcontracts

The Contractor shall not award any work to any subcontractor without prior written approval of the City. The approval will not be given until the Contractor submits to the City a written statement concerning the proposed award to the subcontractor. The statement shall contain all information the City may require.

The Contractor shall be as fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and all other contract documents applicable to the work of the subcontractors and to give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the contract documents.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

Section 35 - Supervising Professional's Status

The Supervising Professional has the right to inspect any or all work. The Supervising Professional has authority to stop the work whenever stoppage may be appropriate to insure the proper execution of the Contract. The Supervising Professional has the authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

The Supervising Professional shall make all measurements and determinations of quantities. Those measurements and determinations are final and conclusive between the parties.

Section 36 - Supervising Professional's Decisions

The Supervising Professional shall, within a reasonable time after their presentation to the Supervising Professional, make decisions in writing on all claims of the City or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the contract documents.

Section 37 - Storing Materials and Supplies

Materials and supplies may be stored at the site of the work at locations agreeable to the City unless specific exception is listed elsewhere in these documents. Ample way for foot traffic and drainage must be provided, and gutters must, at all times, be kept free from obstruction. Traffic on streets shall be interfered with as little as possible. The Contractor may not enter or occupy with agents, employees, tools, or material any private property without first obtaining written permission from its owner. A copy of the permission shall be furnished to the Supervising Professional.

Section 38 - Lands for Work

The Contractor shall provide, at its own expense and without liability to the City, any additional land and access that may be required for temporary construction facilities or for storage of materials.

Section 39 - Cleaning Up

The Contractor shall, as directed by the Supervising Professional, remove at its own expense from the City's property and from all public and private property all temporary structures, rubbish and waste materials resulting from its operations unless otherwise specifically approved, in writing, by the Supervising Professional.

Section 40 - Salvage

The Supervising Professional may designate for salvage any materials from existing structures or underground services. Materials so designated remain City property and shall be transported or stored at a location as the Supervising Professional may direct.

Section 41 - Night, Saturday or Sunday Work

No night or Sunday work (without prior written City approval) will be permitted except in the case of an emergency and then only to the extent absolutely necessary. The City may allow night work which, in the opinion of the Supervising Professional, can be satisfactorily performed at night. Night work is any work between 8:00 p.m. and 7:00 a.m. No Saturday work will be permitted unless the Contractor gives the Supervising Professional at least 48 hours but not more than 5 days notice of the Contractor's intention to work the upcoming Saturday.

Section 42 - Sales Taxes

Under State law the City is exempt from the assessment of State Sales Tax on its direct purchases. Contractors who acquire materials, equipment, supplies, etc. for incorporation in City projects are not likewise exempt. State Law shall prevail. The Bidder shall familiarize itself with the State Law and prepare its Bid accordingly. No extra payment will be allowed under this Contract for failure of the Contractor to make proper allowance in this bid for taxes it must pay.

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period _____, 20__, to _____, 20__, performed any work, furnished any materials, sustained any loss, damage or delay, or otherwise done anything in addition to the regular items (or executed change orders) set forth in the Contract titled Veterans Memorial Indoor Ice Arena Renovation, for which I shall ask, demand, sue for, or claim compensation or extension of time from the City, except as I hereby make claim for additional compensation or extension of time as set forth on the attached itemized statement. I further declare that I have paid all payroll obligations related to this Contract that have become due during the above period and that all invoices related to this Contract received more than 30 days prior to this declaration have been paid in full except as listed below.

There is/is not (Contractor please circle one and strike one as appropriate) an itemized statement attached regarding a request for additional compensation or extension of time.

_____ _____

Contractor Date

By _____
(Signature)

Its _____
(Title of Office)

Past due invoices, if any, are listed below.

CONTRACTOR'S AFFIDAVIT

The undersigned Contractor,_____, represents that on _____, 20___, it was awarded a contract by the City of Ann Arbor, Michigan to_____ under the terms and conditions of a Contract titled Veterans Memorial Indoor Ice Arena Renovation. The Contractor represents that all work has now been accomplished and the Contract is complete.

The Contractor warrants and certifies that all of its indebtedness arising by reason of the Contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the project, as well as all other claims arising from the performance of the Contract, have been fully paid or satisfactorily settled. The Contractor agrees that, if any claim should hereafter arise, it shall assume responsibility for it immediately upon request to do so by the City of Ann Arbor.

The Contractor, for valuable consideration received, does further waive, release and relinquish any and all claims or right of lien which the Contractor now has or may acquire upon the subject premises for labor and material used in the project owned by the City of Ann Arbor.

This affidavit is freely and voluntarily given with full knowledge of the facts.

_____ _____
Contractor Date

By _____
(Signature)

Its _____
(Title of Office)

Subscribed and sworn to before me, on this _____ day of _____, 20__
_____ , _____ County, Michigan
Notary Public
_____ County, MI
My commission expires on:

STANDARD SPECIFICATIONS

All work under this contract shall be performed in accordance with the Public Services Department Standard Specifications in effect at the date of availability of the contract documents stipulated in the Advertisement. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the Detailed Specifications included in these contract documents.

A copy of the Public Services Department Standard Specifications may be purchased from the Engineering Division, (Fourth Floor, City Hall, Ann Arbor, Michigan), for $35.00 per copy. In addition, a copy of these Standard Specifications is available for public viewing at the Engineering Division office, for review Monday through Friday between the hours of 8:30 a.m. and 4:00 p.m. Copies of the Standard Specifications can also be downloaded from the web link:

http://www.a2gov.org/government/publicservices/project_management/privatedev/pages/standardspecificationsbook.aspx.

DETAILED SPECIFICATIONS

SECTION 01010

SUMMARY OF WORK

PART 1 – GENERAL

1.1 SUMMARY OF WORK

A. Work under this contract consists of miscellaneous repairs including roof retrofit, replacement of exterior siding, gutters, downspouts and eave trim, repair of base plates and replacement of nuts/washers on anchor bolts, repair of purlins, painting, replacement of existing exterior lighting and providing lighting controls at the City of Ann Arbor Veterans Memorial Indoor Ice Arena and related work.

B. The principal features of the Work to be performed under this Contract are:

SINGLE PRIME CONTRACT: Includes furnishing and installing facilities as described in the Contract Documents including the architectural, structural and other work, complete with all associated electrical systems improvements.

C. The foregoing description(s) shall not be construed as a complete description of all work required.

1.2 CONTRACT DOCUMENTS

A. The Work to be done is shown on the set of Drawings entitled Veterans Memorial Indoor Ice Arena Renovation. The numbers and titles of all Drawings appear on the cover sheet of the Drawings. All drawings so enumerated shall be considered an integral part of the Contract Documents as defined herein.

B. Where references in the Contract Documents are made to Contractors for specific disciplines of work (e.g. Electrical Contractor, etc.), these references shall be interpreted to be the single prime Contractor when the project is bid or awarded as a single prime contract.

C. The prime Contractor shall be responsible for all work in the Contract Documents regardless of the division of disciplines.

D. Engineer shall provide the Contractor an electronic copy on CD of the Specifications and Contract Drawings. The Contractor shall be responsible for the production of his construction sets.

1.3 GENERAL ARRANGEMENT

A. Drawings indicate the extent and general arrangement of the work. If any departures from the Drawings are deemed necessary by the Contractor to accommodate the materials and equipment Contractor proposes to furnish, details of such departures and reasons therefore shall be submitted as soon as practicable to the Engineer for approval by Owner and Engineer. No such departures shall be made without the prior written approval of the Owner or Engineer. Approved changes shall be made without additional cost to the Owner for this work or related work under other Contracts of the Project.

B. The specific equipment proposed for use by the Contractor on the project may require changes in structures, auxiliary equipment, piping, electrical, mechanical, controls or other work to provide a complete satisfactory operating installation. The Contractor shall

submit to the Engineer, for approval by Owner and Engineer, all necessary Drawings and details showing such changes to verify conformance with the overall project structural and architectural requirements and overall project operating performance. The Bid Price shall include all costs in connection with the preparation of new drawings and details and all changes to construction work to accommodate the proposed equipment, including increases in the costs of other Contracts.

1.4 CONSTRUCTION PERMITS, EASEMENTS AND ENCROACHMENTS

A. The Owner shall obtain or cause to be obtained all permanent and temporary construction easements required. No easements are anticipated for this project.

B. The Contractor shall obtain, keep current and pay all fees for any other necessary construction permits from those authorities, agencies, or municipalities having jurisdiction over land areas, utilities, or structures which are located within the Contract limits and which will be occupied, encountered, used, or temporarily interrupted by the Contractor's operations unless otherwise stated. Contractor shall pay plan review fees and any other fees for required permits. Record copies of all permits shall be furnished to the Engineer and Owner.

C. When construction permits are accompanied by regulations or requirements issued by a particular authority, agency or municipality, it shall be the Contractor's responsibility to become familiar with and comply with such regulations or requirements as they apply to Contractor’s operations on this Project.

D. The Contractor will be required to follow the requirements established by all permits necessary for the construction of this project. The following is a list of all permits that must be obtained prior to the beginning of construction.

1. Applicable City Building Permits (all necessary trades).

E. The permits for the various trades shall be applied for and paid for by the Contractor. A cash allowance has been included in the contract price for the payment of the permit fees. The Contractor must submit a copy of these permits to the Engineer prior to construction.

1.5 ADDITIONAL ENGINEERING SERVICES

A. In the event that the Engineer is required to provide additional engineering services as a result of substitution of materials or equipment which are not "or equal" by the Contractor, or changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or if the Engineer is required to examine and evaluate any changes proposed by the Contractor for the convenience of the Contractor, then the Engineer's charges in connection with such additional services shall be charged to the Contractor by the Owner.

B. Structural design shown on the Contract Drawings is based upon typical weights for major items as indicated on the Contract Drawings and specified. If the items furnished exceed the weights of said items, the Contractor shall assume the responsibility for all costs of redesign and for any construction changes required to accommodate the equipment furnished, including the Engineer's expenses in connection therewith.

C. In the event that the Engineer is required to provide additional engineering services as a result of Contractor's errors, omissions, or failure to conform to the requirements of the Contract Documents, or if the Engineer is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, then the

Engineer's charges in connection with such additional services shall be charged to the Contractor by the Owner.

1.6 PROTECTION OF WORK

A. Unless otherwise specifically permitted, all work that would be subject to damage shall be stopped during inclement, stormy or freezing weather. Only such work as will not suffer injury to workmanship or materials will be permitted. Contractor shall carefully protect the work against damage or injury from the weather, and when work is permitted during freezing weather, Contractor shall provide and maintain approved facilities for heating the materials and for protecting the finished work.

1.7 RESIDENT PROJECT REPRESENTATIVES

A. If the Owner authorizes the Engineer, the Engineer shall provide a resident project representative to assist the Engineer in carrying out his responsibilities at the site. The resident may not be full-time on-site and the Contractor shall be responsible for coordination with the Engineer. The furnishing of such resident project representatives shall not make the Engineer responsible for the Contractor's construction means, methods, techniques, sequences, or procedures or for any safety precautions or programs in connection with the work. The Contractor shall remain solely responsible for meeting the requirements of the Contract Documents.

1.8 FIRE PROTECTION

A. Contractor shall take all necessary precautions to prevent fires at or adjacent to the work, buildings, etc., and shall provide adequate facilities for extinguishing fires which do occur. Burning of debris is not permitted on the project site.

B. When fire or explosion hazards are created in the vicinity of the work as a result of the locations of fuel tanks, or similar hazardous utilities or devices, the Contractor shall immediately alert the local Fire Marshal, the Engineer, and the Owner of such tank or device. The Contractor shall exercise all safety precautions and shall comply with all instructions issued by the Fire Marshal and shall cooperate with the Owner of the tank or device to prevent the occurrence of fire or explosion.

C. Fire protection alarm and detection systems shall comply with the Michigan International Building Code 2009 and NFPA standards.

D. Hydrants must be maintained in service and approved during all phases of work.

E. Storage area for construction materials must not interfere with fire/emergency site access.

F. All material demolished from site should not be stored on location.

1.9 FIRST AID FACILITIES AND ACCIDENTS

A. First Aid Facilities

1. The Contractor shall provide at the site such equipment and facilities as are necessary to supply first aid to any of Contractor's personnel who may be injured in connection with the work.

B. Accidents

1. The Contractor shall promptly report, in writing, to the Engineer and Owner all accidents whatsoever out of, or in connection with, the performance of the work, whether on or adjacent to the site, which cause death, personal injury or property damage, giving full details and statements of witnesses.

2. If death, serious injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Owner and the Engineer.

3. If any claim is made by anyone against the Contractor or a Subcontractor on account of any accidents, the Contractor shall promptly report the facts, in writing, to the Engineer and Owner, giving full details of the claim.

1.10 LIMITS OF WORK AREA

A. The Contractor shall confine the construction operations within the Contract limits shown on the Drawings and/or property lines and/or fence lines. Storage of equipment and materials, or erection and use of sheds outside of the Contract limits, if such areas are the property of the Owner, shall be used only with the Owner's approval. Such storage or temporary structures, even within the Contract's limits, shall be confined to the Owner's property and shall not be placed on properties designated as easements or rights-of-way unless specifically permitted elsewhere in the Contract Documents.

1.11 WEATHER CONDITIONS

A. No work shall be done when the weather is unsuitable. The Contractor shall take necessary precautions (in the event of impending storms) to protect all work, materials, or equipment from damage or deterioration due to floods, driving rain, or wind, and snow storms. The Owner reserves the right to order that additional protection measures over and beyond those proposed by the Contractor, be taken to safeguard all components of the Project. The Contractor shall not claim any compensation for such precautionary measures so ordered, nor claim any compensation from the Owner for damage to the work from weather elements.

B. The Engineer shall have permissive authority over the work which is proposed to be done during the winter months. The Contractor shall provide adequate weather protection, temporary heating, ground thawing equipment and take any other measures which are necessary to insure that the work performed during the winter months is properly installed and protected against damage from freezing.

C. Any and all work performed during adverse conditions shall adhere to the applicable Codes and Standards (i.e. ACI, ASTM, etc.).

1.12 USE OF FACILITIES BEFORE COMPLETION

A. The Owner reserves the right to enter and use any portion of the constructed facilities before final completion of the whole work to be done under this Contract. However, only those portions of the facilities which have been completed to the Owner’s satisfaction, as evidenced by issuing a Certificate of Partial Completion covering that part of the work, shall be placed in service.

B. Consistent with the approved progress schedule, the Contractor shall cooperate with the Owner, his agents, and the Engineer to accelerate completion of those facilities, or portions thereof, which have been designated for early use by the Owner.

1.13 DELIVERY, STORAGE, AND HANDLING

A. All materials, supplies and equipment, whether furnished by the Contractor or by the Owner, shall be delivered, stored and handled as to prevent the inclusion of foreign materials and/or damage by water, freezing, breakage or other causes. Packaged materials shall be delivered in the original unopened containers and shall be stored until ready for use. All materials which have been stored shall meet the requirements of the Specifications at the time they are used in the project.

1.14 PROJECT PROGRESS MEETING

A. It shall be the responsibility of the CONTRACTOR to have a representative, including key subcontractors, present at each meeting. The CONTRACTOR shall be available for meetings shall be held at least twice a month as necessary.

1.15 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. GENERAL

The method of measurement and the basis of payment for each item in the Proposal will be as specified in the schedule attached. The items are generally grouped by the section of the Specifications under which the particular unit of work is detailed. There will be no payment allowed for any unit of work not specifically mentioned in the Proposal as a bid item, and any such unit of work not mentioned in the Proposal, but necessary for the completion of the Project, will be considered as incidental to the construction of the Project.

B. MEASUREMENT

Quantities of work completed under the Contract will be measured by the ENGINEER according to the United States standard measures. When tons are specified, the unit shall be the ton of 2000 pounds. When measurements are stated in miles, stations, acres, they will be horizontal measurements unless specified otherwise. Where measurements are specified to be "in place," they will be taken along the actual surface of the completed item to obtain lineal, area, or volume measurements.

C. PAYMENT

In each and every instance in the following Measurement and Payment Schedule, where a Basis of Payment is specified, it shall be understood to be prefaced by the following statement, "**The contract unit price bid in the Proposal will be payment in full for all labor, materials, and equipment necessary to finish, install and do the following according to the Plans and Specifications**." Payment shall be made on the basis of the actual quantity of the item completed and accepted at the unit price for such item named in the Proposal.

SCHEDULE FOLLOWS

BID ITEMS – BASE BID
(ITEMS APPLY SEPARATELY TO EACH LOCATION SPECIFIED IN THE BID FORM)

ITEM IN PROPOSAL	METHOD OF MEASUREMENT	BASIS OF PAYMENT
General Conditions, Insurance, Bonds Mobilization	By the unit lump sum (LS).	For the complete cost of insurance, bonds, permits, mobilization for the project, and other requirements of General Conditions. Includes offices, conveniences, and other temporary facilities, site preparation, and whatever means the CONTRACTOR deems necessary for accessing the work, organizing the project, coordination with OWNER, ENGINEER, third parties and subcontractors, field measure and prepare shop drawings, paperwork, bringing equipment to the site, furnishing and installing the project sign, management of the project, installing and maintaining safety fencing, barricades, signage, and all related work. Any costs assumed to be above and beyond the value of this pay item shall be incidental to other pay items in the Contract. The maximum amount of this item shall be 5% of the total bid price.
Roofing, Gutters, and Downspouts	By the unit lump sum (LS)	Disassemble, remove, dispose of existing ridge vent, downspouts, gutters, and all other related rooftop accessories. Disassemble, remove and temporarily store the existing antenna, weather station. Disassemble, remove, storage and protect the solar collector, piping and framing, and all other rooftop accessories in an area designated by the Owner. Furnish and install new roofing, insulation, clips, fascia, trim, gutters, downspouts, and all related materials. Reinstall existing antenna and weather station. This work includes caulking, sealing and all related work for a leak-free system and installation.

ITEM IN PROPOSAL	METHOD OF MEASUREMENT	BASIS OF PAYMENT
Siding	By the unit lump sum (LS).	Remove and dispose of existing siding, insulation, exterior lights and all related components. Furnish and install new siding, insulation, trim, exterior lights, and all related materials. This work includes caulking, sealing and all related work for a leak-free system and installation. This work shall include any additional General Conditions, Insurance, Bonds, mobilization and related expenses associated with this Alternate Bid Item.
Frame and Purlin Improvements	By the unit lump sum (LS).	As scheduled on the drawings, clean existing purlins, install new purlins, repair or cut out existing purlins. This item includes all demolition, protection of the arena, fastening, welding, hardware, tightening of existing bolts on all roof angle bracing and rod cross bracing, column base plate repair, cleaning, replacement of nuts, coating, concrete wash and all related work. This item also includes the demolition of the abandoned speaker system, associated conduit, wiring, mounting hardware and related components.
Painting	By the unit lump sum (LS).	Prepare surface, provide containment, prime and paint the surfaces noted on the drawings, including but not necessarily limited to the purlins, frames where the speaker system and related components have been removed. This item includes ventilation, clean up, all third party testing of paint thickness, surface preparation and environmental conditions, reporting, and lead based paint testing.

ITEM IN PROPOSAL	METHOD OF MEASUREMENT	BASIS OF PAYMENT
Lead Based Paint Abatement	By the unit lump sum (LS).	Perform lead based paint abatement on existing items that are to be painted. This item includes stabilization, removal and disposal of lead based coatings and associated removal media, personal protective equipment, temporary barriers and containment as required, all related cleaning of equipment, restoration, required documentation for transfer, shipping and disposal manifests, and all related work. Note that testing for lead based paint is included in other items.
Lighting Controller	By the unit lump sum (LS).	Furnish and install a new lighting controller including conduit, conductors, controller system with enclosure, programming, testing and training, replacement of existing breakers, and all related work.
Demobilization and Project Close Out	By the unit lump sum (LS).	Remove all equipment from the site, restore, return the OWNER's facilities to full use. Provide record documentation and as-built drawings, warranty documents, and all related paperwork.
Allowances – Miscellaneous Repairs and Permits	By the unit lump sum (LS).	Allowance is to be used for miscellaneous repairs as determined necessary by the OWNER, and to apply for, obtain and pay for all required permits and permit inspection fees. This excludes work called out under other Bid items.

END OF SECTION

SECTION 01210

ALLOWANCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cash Allowances

1.2 DEFINITIONS

A. Cash Allowance: A monetary sum that includes, as part of the contract price, the associated costs and requirements to complete the specified allowance.

1.3 SUBMITTALS

A. Submit detailed invoices to indicate the work performed or delivery slips to indicate actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.4 OWNER'S INSTRUCTIONS

A. At the earliest feasible date after contract award the Contractor shall notify all utility companies and begin coordination efforts in order to avoid delay in performance of the work.

B. Use allowances only as directed for Owner's purposes, and only by Change Orders which designate amounts to be charged to the allowance.

C. If the actual price for the specified allowance is more or less than the stated allowance, the contract price shall be adjusted accordingly by Change Order. The adjustment in contract price shall be made in accordance with the General Conditions.

D. At project closeout, any amounts remaining in allowances will be credited to Owner by Change Order.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related construction activities.

3.2 CASH ALLOWANCE FOR MISCELLANEOUS REPAIRS AND PERMITS

A. A cash allowance of $35,000 shall be included in the contract price for miscellaneous repairs and permits as directed by the City. All administrative work and coordination between the Contractor and City shall be considered incidental to the Contract.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittal Procedures

B. Certifications

C Shop Drawings

D. Product Data

E. Samples

F. Manufacturers' Instructions

G. Manufacturers' Field Reports

H. Construction Schedule

I. Submittal Schedule

1.2 SUBMITTAL PROCEDURES

A. Package each submittal appropriately for shipping and handling. This shall include an index either on the transmittal or within the submittal itself. Transmit each submittal from CONTRACTOR to ENGINEER using a transmittal form. Submittals received from sources other than CONTRACTOR will be returned without action. Use separate transmittals for items from different specification sections. Number each submittal consecutively. Resubmittals should have the same number as the original, plus a letter designation for each Resubmittal (i.e. 7-A, 7-B, etc.)

B. Indicate on the transmittal 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 Document requirements. On Resubmittal, all changes shall be clearly identified for ease of review. Resubmittals shall be reviewed for the clearly identified changes only. Any changes not clearly identified will not be reviewed and original submittal shall govern.

C. Include the following information on the label for processing and recording action taken.

1. Project name.

2. Date.

3. Name and address of ENGINEER.

4. Name and address of CONTRACTOR.

5. Name and address of subcontractor.

6. Name and address of supplier.

7. Name of manufacturer.

8. Number and title of appropriate specification sections.

9. Drawing number and detail references, as appropriate.

D. Schedule submittals to expedite the Project, and deliver to ENGINEER at business address. Coordinate submission of related items. Coordinate related activities that require sequential activity.

E. Submit a schedule of shop drawing submittals.

F. Review and approve shop drawings, project data, and samples before submitting them.

G. Verify field measurements, field construction criteria, catalog numbers, and similar data. Indicate on the submission exactly what was verified.

H. Any markings done by CONTRACTOR shall be done in a color other than red. Red is reserved for ENGINEER's marking.

I. The number of copies to be submitted will be determined at the pre-construction conference. Reproducible may be submitted and will be marked and returned to CONTRACTOR. Blue or black line prints shall be submitted in sufficient quantity for distribution to ENGINEER and OWNER recipients.

J. Coordinate each submittal with the requirements of the Contract Documents.

K. Provide space for CONTRACTOR and ENGINEER review stamps.

L. Apply CONTRACTOR's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

M. Submit the number of copies that the CONTRACTOR requires, plus four copies that will be retained by the OWNER and ENGINEER.

N. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

O. No claim will be allowed for damages or extension of time because of delays in the work resulting from rejection of material or from revision and resubmittal of shop drawings, project data, or samples.

P. No extension of contract time will be authorized because of failure to transmit submittals to ENGINEER sufficiently in advance of the work to permit processing.

Q. ENGINEER reserves the right to withhold action on a submittal that requires coordination with other submittals until related submittals are received.

R. Do not install materials or equipment which requires submittals until the submittals are returned with ENGINEER's/OWNER's stamp and initials or signature indicating approval. The OWNER shall have final approval authority.

S. CONTRACTOR's responsibility of errors, omissions, and deviations from requirements of Contract Documents in submittals is not relieved by the ENGINEER's review.

T. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with requirements.

U. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

V. Submittals not requested in conformance with this Specification will not be recognized or processed.

W. Revise and resubmit as required, identify all changes made since the previous submittal.

X. In the event that more than two re-submittals of any submittal is necessary to achieve conformance to the contract requirements, CONTRACTOR shall be charged for excess engineering. The OWNER shall deduct these charges from the CONTRACTOR's final payment. Charges will be $115.00/hr. minimum 4 hours, for each additional submittal of an item. A tabulated record of such charges will be provided for the CONTRACTOR’s review prior to the processing of the final payment.

Y. Submit new project data and samples when the initial submittal is returned disapproved.

1.3 CERTIFICATIONS

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the CONTRACTOR to ENGINEER, in quantities specified for Product Data.

B. Indicate that the material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certifications may be recent or previous test results of the material or product, but must be acceptable to ENGINEER.

1.4 SHOP DRAWINGS

A. Shop Drawings: Submit to ENGINEER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with Paragraph 1.2 - Submittal Procedures.

B. 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.

C. Shop drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:

1. Dimension.

2. Identification of products and materials included.

3. Compliance with specified standards.

4. Notation of coordination requirements.

5. Notation of dimensions established by field measurements.

D. Nameplate data for equipment including electric motors shall be included on shop drawings. Electric motor data shall state the manufacturer, horsepower, service factor, voltage, enclosure type, oversize wiring box, etc.

E. Shop drawings shall indicate shop painting requirements to include type of paint and manufacturer.

F. Standard manufactured items in the form of catalog work sheets showing illustrated cuts of the items to be furnished, scale details, sizes, dimensions, quantity, and all other pertinent information should be submitted and approved in a similar manner.

G. Measurements given on shop drawings or standard catalog sheets, as established from contract drawings and as approved by ENGINEER, shall be followed. When it is necessary to verify field measurements, they shall be checked and established by CONTRACTOR. The field measurements so established shall be followed by CONTRACTOR and by all affected trades.

H. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.5 PRODUCT DATA

A. Product Data: Submit to ENGINEER for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with Paragraph 1.2 - Submittal Procedures.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.6 SAMPLES

A. 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 or materials, color range sets, and swatches showing color, texture, and pattern.

B. Mount, display, or package samples in the manner specified to facilitate review of qualities indicated. Prepare samples to match ENGINEER’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.

C. 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.

D. Refer to other specifications sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

E. 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.

1. Preliminary Submittals will be reviewed and returned with ENGINEER's mark indicating selection and other action.

F. Except for samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets; one will be returned marked with the action taken.

G. Maintain sets of samples, as returned, at the site, for quality comparisons throughout the course of construction.

H. Unless noncompliance with Contract Document provisions is observed the submittal may serve as the final submittal.

I. Sample sets may be used to obtain final acceptance of the construction associated with each set.

1.7 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to ENGINEER for delivery to OWNER in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.8 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the OWNER.

B. Submit report in duplicate, within 7 days of observation, to ENGINEER and OWNER for Information.

C. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.9 CONSTRUCTION SCHEDULE

A. Bar Chart Schedule:

1. Prepare a fully developed, horizontal bar chart type construction schedule. Schedule shall be prepared electronically in Microsoft Project with critical path and links shown. Submit color copies of the schedule within 30 days of the date established for commencement of the work.

2. Provide a separate item 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 on schedule of values.

3. Prepare schedule of sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for entire construction period.

4. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on 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.

5. Coordinate construction schedule with schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other schedules.

6. Indicate completion in advance of the date established for substantial completion. Indicate substantial completion of schedule to allow time for ENGINEER's procedures necessary for certification of substantial completion

B. Schedule Updating: Provide an updated construction schedule at each progress meeting. Color copies of the updated schedule shall be prepared for all attendees.

1.10 SUBMITTAL SCHEDULE

A. After development and acceptance of the construction schedule, prepare a complete schedule of submittals. Submit schedule within 10 days of the date required for establishment of construction schedule.

B. Coordinate submittal schedule with the list of subcontracts, schedule of values, and the list of products as well as construction schedule.

C. Prepare schedule in chronological order; include submittals required during the first 90 days. 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.

7. Scheduled date ENGINEER's final release or approval.

D. The submittal schedule shall reflect critical path shop drawings that must be expedited.

E. Following response to initial submittal, print and distribute copies to ENGINEER, OWNER, subcontractors, and other parities required to comply with submittal dates indicated. Post copies in the project meeting room and field office.

F. When revisions are made, distribute to the same parities 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.

G. Schedule Updating: Provide an updated submittal schedule at each progress meeting.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 ENGINEER'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, ENGINEER will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is CONTRACTOR's responsibility.

B. Action Stamp: ENGINEER will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken" that part of the work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents; final acceptance will depend upon the compliance.

2. 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 notation or correction on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Returned for Resubmittal: When submittal is marked "Rejected" or "Revise and Resubmit" do not proceed with the 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.

a. Do not permit submittals marked “Rejected” or “Revise and Resubmit” to be used at site, or elsewhere where work is in progress.

4. Additional Information Needed: When submittal is marked “Submit Specified Item” CONTRACTOR shall submit requested information.

5. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked “Acknowledge Receipt”.

6. The approval of ENGINEER shall not relieve CONTRACTOR of responsibility for errors on drawings or submittals as ENGINEER’s checking is intended to cover compliance with drawings and specifications and not enter into every detail of the shop work.

END OF SECTION

SECTION 01370

LEAD BASED PAINT REMOVAL

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The scope of work for this project covers the supplying of all labor, tools, materials, equipment, services and appurtenances to accomplish the work described below and shown on the Drawings. The work shall be performed to the complete satisfaction of the Owner or the Engineer, in accordance with the current EPA and OSHA regulations, State Labor and Industry and Department of Environmental Resources regulations (if applicable) and any other applicable state and local government.

B. Work under this project includes but is not limited to the following:

1. Demolition and removal of the lead-based paint materials including the following:

a. All items to be demolished or modified in the arena including base plates, structural steel and all other related items.

2. The Contractor will be responsible for the abatement and demolition of any lead-based paint materials and any other painted surfaces in the locations identified above to the extent needed to properly remove and dispose of the items.

3. The Contractor will be responsible for the abatement of any other lead-based paint that is disturbed as part of any demolition work or new work included in this project.

4. The Contractor will be responsible for the removal, storage, transportation, and disposal of all lead-based paint and hazardous materials generated by this work.

5. Coordination of all lead-based paint abatement work with the Owner and the Contractor.

1.2 CONTROL OF WORK

A. All work which does not conform to the requirements of this Section will be considered unacceptable.

B. Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner.

C. If the Owner or Engineer finds the materials furnished or the work performed has resulted in an unacceptable finished product the affected work or material shall be removed and replaced or otherwise corrected by and at the expense of the Contractor.

1.3 STIPULATIONS

A. For bidding and project execution purposes, it shall be assumed that all existing surfaces in the locations identified in paragraph 1.01.B.1 are coated with lead based paint (LBP).

B. The procedures specified in this section are guidelines for minimum performance. The Contractor is responsible for his own methods of operations and conformance to regulatory codes, rules and guidelines. The Contractor is required to obtain all permits, licenses and approvals (if required) to perform the work, including any rights to use patented systems.

1.4 QUALITY ASSURANCE

A. Compliance with Standards and Regulations

1. The Contractor is solely responsible for compliance with all Federal, State, and Local laws and regulations and all Industry Standard practices associated with the abatement, demolition, storage, transport, and disposal of Hazardous Wastes, as well as all general conditions, special conditions, and all other sections within the contract document.

2. Contractor shall demonstrate to the satisfaction of the Owner or Engineer that the project was completed in accordance with this Section and any applicable EPA arid MDEQ standards and regulations.

B. Worker Requirements

1. The Contractor shall furnish proof that each employee has had previous instruction on the hazards of lead exposure, on use and fitting of respirators, on protective dress, on use of decontamination procedures, on entry and exit from work areas, and on all aspects of work procedures and protective measures and all other requirements.

2. Submit verification, signed by an occupational health physician, that each employee has been recently examined as required by OSHA regulations. Medical examination will be required prior to entering the work area.

3. Submit names and training certificates of the superintendent and foreman who will be performing work related to this project.

4. Provide verification that the Contractor has provided the following information to the examining physician:

a. A copy of OSHA Standard (29 CFR 1910.1025)

b. A description of the affected employee’s duties as they relate to the employee’s exposure.

c. The employee’s current or anticipated exposure level.

d. A description of any personal protective and respiratory equipment to be used.

e. Prior lead determination and information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

1.5 PLACEMENT OF WARNING SIGNS

A. Post warning signs in and around the work area. Locate signs at such a distance that personnel may read the sign and take necessary protective steps required before entering the work area.

B. Inform other employers on-site of the nature of the Contractor's work and requirements pertaining to regulated areas in order to comply with OSHA regulation 29 CFR 1910.120. Such notification shall be coordinated with, and approved by the Owner.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 LEAD ABATEMENT

A. The Contractor shall protect all adjacent surfaces from lead dust during abatement.

B. The Contractor shall be responsible for the removal, storage, transportation, and dispose of all lead based paint materials.

3.2 REMOVAL

A. Removal work shall not commence until:

1. Work has been coordinated with the Owner.

2. Arrangements have been made for disposal of waste at an acceptable site.

3. Work areas and parts of the building required to remain in use are effectively segregated.

4. Tools, equipment, and material waste receptors are on hand.

5. Arrangements have been made for building security.

6. All preparatory steps have been taken and applicable notices posted and permits obtained (if required).

3.3 DAMAGES

A. The Contractor shall protect adjacent areas from contamination.

3.4 DAILY CLEANUP

A. A thorough cleanup of the entire area under active abatement shall occur daily during the entire abatement process

3.5 STORAGE OF LIQUID AND SOLID WASTE

A. The Contractor must make provisions for the safe storage of waste on-site prior to disposal. For safety reasons, waste storage areas must be treated as abatement areas and access restricted.

3.6 CONTROLLING OFFSITE DISPERSAL

A. Basic control measures to minimize the dispersal of lead dust and debris from the work area are:

1. Control and limit access to the abatement work areas.

2. Limit tracking of dust and debris.

3. Implement a program of ongoing cleanup.

3.7 CLEANUP AND CLEARANCE TESTING

A. The Contractor shall perform air, wipe, water, and/or Toxicity Characteristics Leaching Procedure (TCLP) sample collection during the abatement under the supervision of the Owner or the Engineer.

B. Final cleanup shall proceed as follows:

1. The entire abatement area shall be washed down with a Tri-Sodium Phosphate (TSP) solution. To avoid recontaminating the cleaned area, this solution should be changed according to the manufacturer's recommendations. The dirty water from this operation is considered hazardous and shall be disposed of in watertight containers as required by Paragraph 2.09 below.

C. After this phase of the final cleanup is complete, a visual inspection will be performed by the Owner or the Engineer to ensure that all visible dust and debris have been removed from the work surfaces and the work area. Any unsatisfactory results will cause the Contractor to re-clean the affected surfaces until the inspector is satisfied with the results.

D. Clearance testing may now take place by taking wipe samples of the abated area. The clearance criterion is 200 micrograms per square foot. Clearance testing is the responsibility of the Contractor.

E. Any areas which do not meet these criteria shall be re-cleaned and restested until the standards are met.

3.8 DISPOSAL OF LEAD WASTE

A. The lead paint chips, all wastewater from cleaning operations, all plastic used for containment, and all rags, cloths or sponges used for cleaning shall be disposed of as hazardous waste. These materials shall be removed in sealed, labeled containers at an authorized disposal site in accordance with all applicable hazardous waste regulations.

B. The waste materials shall be handled as potentially hazardous waste in accordance with applicable sections of the Natural Resources and Environmental Protection Act, 1994 PA 451. No separate payment for disposal shall be made and the cost of this work is to be included in the work. The Contractor shall furnish to the Owner a certificate of disposal of this material at an appropriate disposal facility, issued by the office of the receiving disposal facility.

C. A waste manifest shall be forwarded to the Owner after the disposal.

END OF SECTION

SECTION 01450

QUALITY CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality control and control of installation.

B. References.

C. Testing and inspection services.

D. Manufacturers' field services.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from ENGINEER before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on Shop Drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

H. All materials and equipment shall be new, unless otherwise noted.

1.3 REFERENCES

A. Conform to reference standard by date of issue current on date of Contract Documents.

B. Should specified reference standards conflict with Contract Documents, request clarification from the ENGINEER before proceeding.

C. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the ENGINEER shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.4 TESTING AND INSPECTION SERVICES

A. CONTRACTOR shall be responsible for providing, paying for, coordinating and scheduling the services of an independent testing firm (acceptable to OWNER) to perform all testing and related tasks.

B. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by the ENGINEER.

C. Acceptable testing companies for selection by the CONTRACTOR are:

1. Dixon Engineering, Inc. (Lake Odessa, Michigan; Telephone: (616) 374-3221)

2. Nelson Tank Engineering and Consulting, Inc. (Lansing, Michigan; Telephone: (517) 321-1692)

C. Testing, inspections and source quality control may occur on or off the project site. Perform off-site testing as required by the ENGINEER or the OWNER.

D. Reports will be submitted by the independent firm to the ENGINEER and CONTRACTOR, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. CONTRACTOR shall coordinate with ENGINEER and/or OWNER; cooperate and coordinate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify ENGINEER and independent firm a minimum of 24 hours prior to expected time for operations requiring services.

2. Make arrangements with independent firm and pay for additional samples and tests required for CONTRACTOR's use.

F. Independent testing firm will provide the testing services listed below. Any additional required by the Contract Documents beyond what is listed, shall be provided by the CONTRACTOR.

1. Painting

a. Paint thickness measurements for primer, intermediate and final coats.

b. Surface preparation.

c. Environmental conditions for painting including humidity, dew point, ambient temperature, material temperature, etc.

G. CONTRACTOR shall not perform the work without the independent firm on site performing the required tests.

H. Testing and employment of testing agency or laboratory shall not relieve CONTRACTOR of obligation to perform Work in accordance with requirements of Contract Documents.

I. The independent firm on instructions by the ENGINEER shall perform re-testing or re-inspection required because of non-conformance to specified requirements. Payment for re-testing or re-inspection will be the responsibility of the CONTRACTOR.

J. Agency Responsibilities:

1. Test samples of mixes submitted by CONTRACTOR.

2. Provide qualified personnel at site. Cooperate with ENGINEER and CONTRACTOR in performance of services.

3. Perform specified sampling and testing of products in accordance with specified standards.

4. Ascertain compliance of materials and mixes with requirements of Contract Documents.

5. Promptly notify ENGINEER and CONTRACTOR of observed irregularities or non-conformance of Work or products.

6. Perform additional tests required by ENGINEER.

K. Agency Reports: After each test, promptly submit two copies of report to ENGINEER and to CONTRACTOR. When requested by ENGINEER, provide interpretation of test results. Include the following:

1. Date issued.

2. Project title and number.

3. Name of inspector.

4. Date and time of sampling or inspection.

5. Identification of product and specifications section.

6. Location in the Project.

7. Type of inspection or test.

8. Date of test.

9. Results of tests.

10. Conformance with Contract Documents.

L. Limits On Testing Authority:

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency or laboratory may not approve or accept any portion of the Work.

3. Agency or laboratory may not assume any duties of CONTRACTOR.

4. Agency or laboratory has no authority to stop the Work.

1.5 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01730

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes, but is not limited to, all demolition and removals of existing materials, equipment necessary to complete the work specified and as shown on the Contract Drawings. Items for removal include solar collectors, downspouts, gutters, antennae, siding and other related items.

1.2 SECTION INCLUDES

A. Selective removal and off-site disposal of following:

1. Portions of building structure shown on Drawings or required to accommodate new construction.

2. Removal of all items marked “remove” or “demolish” on Drawings.

3. Removal and protection of existing fixtures and equipment items identified for salvage by the OWNER.

4. Removal, protection, and reinstallation of existing fixtures and equipment items shown or marked as “remove and reinstall”.

1.3 RELATED SECTIONS

A. Section 01730 – Lead Based Paint Removal

1.4 DEFINITIONS

A. Remove: Remove and dispose of items shown or scheduled. Discard demolished or removed items except for those shown to remain, those shown as reinstalled, those shown as salvaged, and historical items that are to remain OWNER’s property.

B. Remove and Salvage: The OWNER may elect to retain some equipment. Carefully remove and clean salvage items, pack or crate to protect against damage. Transport to a location identified by the OWNER.

C. Remove and Reinstall: Remove items shown; clean, service and otherwise prepare them for reuse; store and protect against damage. Reinstall items in same location or in location shown.

D. Existing to Remain: Protect construction or items shown to remain against damage during selective demolition operations. When permitted by ENGINEER, CONTRACTOR may elect to remove items to suitable, protected storage location during selective demolition and properly clean and reinstall items in their original locations.

1.5 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Proposed dust-control measures.

2. Proposed noise-control measures.

3. Proposed haul routes between Site and disposal areas before commencing this Work.

B. Submit schedules listed below to ENGINEER and OWNER.

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.

2. Inventory list of removed existing equipment not reused in Contract Work. Submit lists to OWNER. OWNER to determine or select items for retention by OWNER.

3. Inventory list of removed and salvaged items.

4. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress.

5. Coordination of OWNER's continuing occupancy of portions of existing building and of OWNER's partial occupancy of completed work.

6. Locations of temporary partitions and means of egress.

C. Inventory list of existing equipment to be removed and not reused in Work. OWNER to determine or select items or retention by OWNER

1.6 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Demolition operations shall comply with OSHA and EPA requirements and EPA notification regulations insofar as they apply to demolition Work under this Contract.

2. Comply with hauling and disposal regulations of authorities having jurisdiction.

3. If hazardous materials are found during demolition operations, comply with all applicable local, state and national requirements for removal and disposal.

B. Facility Access:

1. Do not close, block or obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction.

a. Use alternative routes around closed or obstructed routes if required by governing regulations.

2. Coordinate with OWNER's continuing occupation of portions of existing building, and OWNER's partial occupancy of completed new addition.

3. Plan and present the CONTRACTOR's plan for achieving the partial occupation by OWNER in a submittal and in a meeting with the OWNER and ENGINEER.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Disassemble or cut large items into smaller pieces to promote safe removal and transportation

1. Transport and unload items requested by OWNER to a designated location at the project site.

2. Haul away and dispose of debris and materials neither retained by OWNER, nor reused or reinstalled.

3. Arrange for disposal areas.

4. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

B. Unloading Salvage Items: Where shown on Drawings as “Remove and Salvage,” carefully remove shown items, clean, store and turn over to OWNER and obtain receipt. OWNER will designate site for receiving items.

C. Handling: CONTRACTOR shall take every precaution to prevent spillage of materials being hauled in public streets.

1. It shall be CONTRACTOR's responsibility to immediately clean spillage that may accidentally occur.

2. Do not burn removed material on or within Project Site.

1.8 PROJECT CONDITIONS

A. Materials Ownership:

1. Salvage Materials: Demolished materials shall become CONTRACTOR’s property, except for items or materials shown as reused, salvaged, reinstalled, or otherwise shown to remain OWNER’s property. Remove demolished material promptly from Site with further disposition at CONTRACTOR’s option.

2. Transport items to be salvaged to an area designated by the OWNER as they are removed.

B. Existing Conditions: OWNER will be continuously occupying building areas immediately adjacent to selective demolition areas.

C. OWNER assumes no responsibility for actual condition of items or structures scheduled for demolition.

D. OWNER will maintain conditions existing at Contract commencement insofar as practical. However, variations within structure may occur by OWNER’s removal and salvage operation before selective demolition work begins.

1.9 SEQUENCING

A. Conduct selective demolition work in manner that minimizes need for disruption or interference of OWNER’s normal on-Site operations.

B. Coordinate with OWNER's continuing occupation of portions of existing building, with OWNER's partial occupancy of completed new addition, and with sequencing and startup of the new addition.

C. Include coordination for shutoff, capping, and continuation of utility services, together with details for dust and noise control protection to ensure uninterrupted on-Site operations by OWNER.

1.10 SCHEDULING

A. Schedule: Submit schedule showing proposed methods and sequence of operations for selective demolition work to OWNER's representative for review before commencement of Work.

B. Arrange selective demolition schedule so as not to interfere with OWNER's on-site operations.

C. Give minimum of 15 days advance notice to OWNER of demolition activities, which affect OWNER's normal operations.

D. Give minimum of 15 days advance notice to OWNER if shutdown of service is necessary during changeover.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Before beginning selective demolition work inspect areas of Work. Survey existing conditions and correlate with requirements shown to determine extent of selective demolition required. Photograph existing structure surfaces, equipment, or surrounding properties, which could be misconstrued as damage resulting from selective demolition work. File with OWNER's representative before starting Work.

B. Inventory and record condition of items scheduled as "remove and reinstall or items scheduled as "remove and salvage."

C. Verify disconnection and capping of utilities within the affected area of Work.

D. If unanticipated mechanical, electrical, or structural elements conflict with intended function or design, investigate, and measure nature and extent of conflicts. Promptly submit detailed written reports to OWNER's Representative. Pending receipt of directive from OWNER's Representative, rearrange selective demolition schedule to continue general job progress without delay.

3.2 PREPARATION

A. Cover and protect furniture, equipment, and permanent fixtures from soiling or damage while demolition Work is done in rooms or areas where items remain in place.

B. Protect existing finish work that remains in place and becomes exposed during demolition operations.

C. Protect floors with suitable coverings when necessary.

D. Where selective demolition occurs immediately adjacent to occupied portions of building, or to separate areas of noisy or extensive dirt or dust operations, construct and maintain temporary, insulated, fire-rated solid dustproof partitions.

1. Construct dustproof partitions of minimum 4-inch studs, 5/8-inch-thick drywall (joints taped on occupied side), 1/2-inch fire-retardant plywood on demolition side, and fill partition cavity with sound-deadening insulation.

2. Equip partitions with dustproof doors and security locks if required.

E. Provide weatherproof closures for exterior openings resulting from demolition Work. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.

F. Provide and ensure free and safe passage of OWNER's personnel and general public to and from occupied portions of building around selective demolition areas.

1. Provide temporary barricades and other forms of protection to protect OWNER's personnel and general public from injury.

2. Build temporary covered passageways required by authorities having jurisdiction.

G. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of demolished structures or elements, or adjacent facilities or Work to remain.

H. Cease operations and notify OWNER's Representative immediately if safety of structure seems endangered. Take precautions to support structure until determination is made for continuing operations.

I. Remove protection at completion of Work.

3.3 DEMOLITION

A. Interface with Other Work: Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.

B. Site Tolerances: Provide services for effective air and water pollution controls required by local authorities having jurisdiction.

3.4 REPAIR\RESTORATION

A. Repair damages caused by demolition more extensive than required.

B. Return structures and surfaces to condition existing before commencing selective demolition Work.

C. Repair adjacent construction or surfaces soiled or damaged by selective demolition Work.

D. Promptly repair damages caused to adjacent facilities by demolition Work at no cost to OWNER.

3.5 CLEANING

A. CONTRACTOR shall maintain an order of neatness and good housekeeping comparable to that observed by OWNER.

B. Keep tools, scaffolding, and other demolition equipment in neat and orderly arrangement.

C. Remove dirt, dust, and debris resulting from CONTRACTOR's demolition operations from Site daily. Dirt, dust, and debris shall not collect or interfere with OWNER's facility operations.

D. Upon completion of demolition Work, remove tools, equipment, and demolished materials from Site. Remove protection and leave interior areas broom clean.

END OF SECTION

SECTION 01740

CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Progress Cleaning

B. Final Cleaning

1.2 GENERAL

A. Execute cleaning, during progress of the Work, and at completion of the Work.

B. Adequate periodic cleaning will be a condition for recommendation of progress payments.

C. Waste Disposal

1. Properly dispose all waste materials, surplus materials, debris, and rubbish off the Project Site.

2. Provide suitable containers for storage of waste materials and debris.

3. Do not burn or bury rubbish and waste materials on the Project Site.

4. Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

5. Do not discharge wastes into streams or waterways.

6. Comply with all federal, state, and local anti-pollution laws, ordinances, codes, and regulations when disposing waste materials, debris, and rubbish.

1.3 PROGRESS CLEANING

A. CONTRACTOR shall periodically clean the work site at least once weekly

B. Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.

C. Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended.

D. Remove debris from concealed spaces before enclosing the space.

E. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials.

F. 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.

G. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period.

H. Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces and will not contaminate building systems or electrical or control panels.

1.4 FINAL CLEANING

A. Complete the following cleaning and waste-removal operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

1. Clean and remove from the Project rubbish, waste material, debris, and other foreign substances.

2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

3. Hose clean sidewalks and loading areas.

4. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

5. Leave watercourses, gutters, and ditches open and clean.

6. Repair pavement, roads, sod, and all other areas affected by construction operations and restore them to original condition or to minimum condition specified.

7. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of spatter, grease, stains, fingerprints, films, and similar foreign substances.

8. Clean, wax and polish wood, vinyl, and painted floors.

9. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, and similar spaces.

10. Sweep concrete floors broom clean in unoccupied spaces.

11. Clean transparent materials, including mirrors and glass in doors and windows. Windows on the new pump station and on the existing administration/lab building shall be cleaned by a professional window cleaner. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

12. Remove tags and labels that are not permanent.

13. Touch up and otherwise repair and restore chipped, scratched, dented, or otherwise marred surfaces to specified finish and match adjacent surfaces. 1) Do not paint over “UL” or similar labels, including mechanical and electrical nameplates.

14. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

15. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

16. Replace disposable air filters and clean permanent air filters. Clean the exposed surfaces of diffusers, registers, and grills.

17. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

B. Maintain the cleaning until OWNER occupies the Project or portion thereof.

C. Leave Project clean and in a neat and orderly condition satisfactory to ENGINEER.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Substantial Completion

B. Final Inspection

C. Request for Final Payment

1.2 SUBSTANTIAL COMPLETION

A. Substantial completion shall be the date as certified by the ENGINEER when the construction of the Project, or a specified part thereof, is sufficiently completed, in accordance with the Contract Documents, so that the Project, or specified part, can be fully utilized for the purposes for which it was intended.

B. Before requesting inspection for Certification of Substantial Completion, complete the following. List exceptions in the request:

1. 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 documents for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the contract price.

2. 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.

3. Advise OWNER of pending insurance changeover requirements.

4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

5. Obtain and submit releases enabling OWNER unrestricted use of the work and access.

6. Complete final cleanup requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

7. Provide all required demonstration and training sessions.

C. Inspection Procedures: On receipt of a request for inspection, ENGINEER will either proceed with inspection or advise CONTRACTOR of unfulfilled requirements.

1. ENGINEER will prepare the Certificate of Substantial Completion following inspection, or advise CONTRACTOR of construction that must be completed or corrected before the certificate will be issued.

2. ENGINEER will repeat inspection when requested and assured that the work has been substantially completed.

3. Results of completed inspection will form the basis of requirements for final acceptance.

4. Date of Substantial Completion will begin the warranty period unless noted otherwise.

1.3 FINAL ACCEPTANCE

A. Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request:

1. 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.

2. Submit an updated final statement, accounting for final additional changes to the contract price.

3. Submit a copy of ENGINEER's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance. The list shall be endorsed and dated by the ENGINEER.

4. Submit consent of surety to final payment.

5. Submit a final liquidated damages settlement statement.

6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

7. Submit record drawings, maintenance manuals, damage or settlement survey, property survey, and similar final record information.

8. Deliver tools, spare parts, extra stock, and similar items..

9. Complete commissioning and training of OWNER's personnel.

10. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

11. Complete final cleaning in accordance with Section 01740 – Cleaning and Waste Management.

B. Reinspection Procedure: ENGINEER will inspect the work upon receipt of notice that work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the ENGINEER.

1. Upon completion of reinspection, ENGINEER will prepare a certificate of final acceptance, or advise CONTRACTOR of work that is incomplete or of obligations that have not been fulfilled, but are required for final acceptance.

2. If necessary, reinspection will be repeated.

1.4 REQUEST FOR FINAL PAYMENT

A. Submit request for final payment in accordance with the Agreement and General Conditions.

B. Request for final payment shall include:

1. AIA documents required for progress payments.

2. Documents required in the General Conditions, as may be modified by the Supplementary Conditions.

3. Releases or Waivers of Lien Rights:

a. When submitting releases or waivers of Lien rights, provide release or waiver by CONTRACTOR and each Subcontractor and Supplier that provided CONTRACTOR with labor, material, or equipment.

b. Provide list of Subcontractors and Suppliers for which release or waiver of Lien is required.

c. Each release or waiver of Lien shall be signed by an authorized representative of entity submitting release or waiver to CONTRACTOR, and shall include Subcontractor's or Supplier's corporate seal if applicable.

d. Release or waiver of Lien may be conditional upon receipt of final payment.

4. Consent of Surety.

5. Documentation that all punch list items are complete.

6. Warranties.

7. OWNER's or Maintenance Manuals.

8. Record Drawings being maintained by the CONTRACTOR.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project record documents.

B. Warranties and bonds

1.2 PROJECT RECORD DOCUMENTS

A. Maintain on site one clean, undamaged set of the following record documents; record actual revisions to the Work:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by OWNER.

C. Store record documents separate from documents used for construction.

D. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and modifications.

E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish floor datum.

2. Measured horizontal and vertical locations of all underground and exposed utilities and appurtenances, including thrust blocks, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.

4. Measured horizontal and vertical locations of all concealed and exposed electrical conduits. Conduits shall be shown in plain view on the record drawings with their size and contents indicated.

5. Field changes of dimension and detail.

6. Details not on original Contract drawings.

F. Indicate the date of revisions to the plans in the appropriate box on the plans.

G. Submit documents to ENGINEER with claim for final Application for Payment.

1.3 WARRANTIES AND BONDS

A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers. All warranties shall begin at the Date of Substantial Completion, or at the date of acceptance by the OWNER, whichever is later.

B. Execute and assemble all transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers into one binder.

C. Verify that documents are in proper form, contain full information, and are notarized. Manufacturer's warranties shall be in the name of the Owner.

D. Provide Table of Contents and assemble in three-ring binders with durable plastic cover.

E. Submit prior to Final Application for Payment.

F. Time of submittals:

1. Make warranty submittal within ten days after Date of Substantial Completion, prior to final Application for Payment.

2. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty or bond period.

G. Rejection of Warranties: OWNER reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 05010

METAL MATERIALS

PART 1 – GENERAL

1.1 THE REQUIREMENT

A. Metal materials not otherwise specified shall conform to the requirements of this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Materials for fasteners are included in Section 05050, Metal Fastening.

B. Requirements for specific products made from the materials specified herein are included in other sections of the Specifications. See the section for the specific item in question.

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A.	ASTM A36	Standard Specification for Structural Steel
B.	ASTM A47	Standard Specification for Malleable Iron Castings
C.	ASTM A48	Standard Specification for Gray Iron Castings
D.	ASTM A53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
E.	ASTM A167	Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
F.	ASTM A276	Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes
G.	ASTM A307	Standard Specification for Carbon Steel Externally Threaded Standard Fasteners
H.	ASTM A446	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) quality
I.	ASTM A500	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
J.	ASTM A501	Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
K.	ASTM A529	Standard Specification for Structural Steel with 42 000 psi (290 Mpa) Minimum Yield Point (1/2 in. (12.7 mm) Maximum Thickness)
L.	ASTM A536	Standard Specification for Ductile Iron Castings
M.	ASTM A570	Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality

N. ASTM A992 Standard Specification for Structural Steel Shapes

O. ASTM A666 Standard Specification for Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar for Structural Applications

P. ASTM B26 Standard Specification for Aluminum-Alloy Sand Castings

Q. ASTM B85 Standard Specification for Aluminum-Alloy Die Castings

R. ASTM B108 Standard Specification for Aluminum-Alloy Permanent Mold Castings

S. ASTM B138 Standard Specification for Manganese Bronze Rod, Bar, and Shapes

T. ASTM B209 Standard Specification for Aluminum-Alloy Sheet and Plate

U. ASTM B221 Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes

V. ASTM B308 Standard Specification for Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded

W. ASTM B574 Standard Specification for Nickel-Molybdenum-Chromium Alloy Rod

X. ASTM F468 Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use

Y. ASTM F593 Standard Specification for Stainless Steel Fasteners

1.4 SUBMITTALS

A. Material certifications shall be submitted along with any shop drawings for metal products and fabrications required by other sections of the Specifications.

1.5 QUALITY ASSURANCE

A. Owner may engage the services of a testing agency to test any metal materials for conformance with the material requirements herein. If the material is found to be in conformance with Specifications the cost of testing will be borne by the Owner. If the material does not conform to the Specifications, the cost of testing shall be paid by the Contractor and all materials not in conformance as determined by the Engineer shall be replaced by the Contractor at no additional cost to the Owner. In lieu of replacing materials the Contractor may request further testing to determine conformance, but any such testing shall be paid for by the Contractor regardless of outcome of such testing.

PART 2 – PRODUCTS

2.1 CARBON AND LOW ALLOY STEEL

A. Material types and ASTM designations shall be as listed below:

1.	Structural Fabrications	A992
2.	Sheet Steel	A 570 Grade C
3.	Steel Angles and Plates	A36

4.	Bars and Rods	A 36 or A307 Grade A
5.	Pipe - Structural Use	A53 Type E or S, Grade B
6.	Tubes	A500 Grade B or A501

2.2 STAINLESS STEEL

A. All stainless steel fabrications exposed to underwater service shall be Type 316. All other stainless steel fabrications shall be Type 304, unless noted otherwise.

B. Material types and ASTM designations are listed below:

1.	Plates and Sheets	ASTM A167 or A666 Grade A
2.	Structural Shapes	ASTM A276
3.	Fasteners (Bolts, etc.)	ASTM F593

2.3 ALUMINUM

A. All aluminum shall be alloy 6061-T6, unless otherwise noted or specified herein.

B. Material types and ASTM designations are listed below:

1.	Structural Shapes	ASTM B308
2.	Castings	ASTM B26, B85, or B108
3.	Extruded Bars	ASTM B221 - Alloy 6061
4.	Extruded Rods, Shapes and Tubes	ASTM B221 - Alloy 6063
5.	Plates	ASTM B209 - Alloy 6061
6.	Sheets	ASTM B221 - Alloy 3003

C. All aluminum shall be provided with mill finish unless otherwise noted.

D. Where bolted connections are indicated, aluminum shall be fastened with stainless steel bolts.

E. Aluminum in contact with dissimilar materials and all concrete surfaces shall be insulated with an approved dielectric.

2.4 CAST IRON

A. Material types and ASTM designations are listed below:

1.	Gray	ASTM A48 Class 30B
2.	Malleable	ASTM A47
3.	Ductile	ASTM A536 Grade 60-40-18

2.5 BRONZE

A. Material types and ASTM designations are listed below:

1. Rods, Bars and Sheets ASTM B138 - Alloy B Soft

2.6 HASTELLOY

A. All Hastelloy shall be Alloy C-276.

PART 3 – EXECUTION

(NOT USED)

END OF SECTION

SECTION 05035

GALVANIZING

PART 1 – GENERAL

1.1 THE REQUIREMENT

A. Where galvanizing is called for in the Contract Documents, the galvanizing shall be performed in accordance with the provisions of this Section unless otherwise noted.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Further requirements for galvanizing specific items may be included in other Sections of the Specifications. See section for the specific item in question.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Michigan Building Code

2. ASTM A123 - Standard Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip

3. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

4. ASTM A386 - Standard Specification for Zinc Coating (Hot-Dip) on Assembled Steel Products

5. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

6. ASTM A780 - Standard Practice of Repair of Damaged Hot-Dip Galvanized Coatings

1.4 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Certification that the item(s) are galvanized in accordance with the applicable ASTM standards specified herein. This certification may be included as part of any material certification that may be required by other Sections of the Specifications.

PART 2 – PRODUCTS

2.1 GALVANIC COATING

A. Material composition of the galvanic coating shall be in accordance with the applicable ASTM standards specified herein.

PART 3 -- EXECUTION

3.1 FABRICATED PRODUCTS

A. Products fabricated from rolled, pressed, and forged steel shapes, plates, bars, and strips, 1/8 inch thick and heavier which are to be galvanized shall be galvanized in accordance with ASTM A123. Products shall be fabricated into the largest unit which is practicable to galvanize before the galvanizing is done. Fabrication shall include all operations necessary to complete the unit such as shearing, cutting, punching, forming, drilling, milling, bending, and welding. Components of bolted or riveted assemblies shall be galvanized separately before assembly. When it is necessary to straighten any sections after galvanizing, such work shall be performed without damage to the zinc coating. The galvanizer shall be a member of American Galvanizers Association.

B. Components with partial surface finishes shall be commercial blast cleaned prior to pickling.

C. Sampling and testing of each lot shall be performed prior to shipment from the galvanizer's facility per ASTM A123.

3.2 HARDWARE

A. Iron and steel hardware which is to be galvanized shall be galvanized in accordance with ASTM A153.

3.3 ASSEMBLED PRODUCTS

A. Assembled steel products which are to be galvanized shall be galvanized in accordance with ASTM A123 or ASTM A386. All edges of tightly contacting surfaces shall be completely sealed by welding before galvanizing.

3.4 SHEETS

A. Iron or steel sheets which are to be galvanized shall be galvanized in accordance with ASTM A924.

3.5 REPAIR OF GALVANIZING

A. Galvanized surfaces that are abraded or damaged at any time after the application of zinc coating shall be repaired by thoroughly wire brushing the damaged areas and removing all loose and cracked coating, after which the cleaned areas shall be painted with 2 coats of zinc rich paint meeting the requirements of Federal Specification DOD-P-21035A and shall be thoroughly mixed prior to application. Zinc rich paint shall not be tinted. The total thickness of the 2 coats shall not be less than 6 mils. In lieu of repairing by painting with zinc rich paint, other methods of repairing galvanized surfaces in accordance with ASTM A780 may be used provided the proposed method is acceptable to the Engineer.

END OF SECTION

SECTION 05050

METAL FASTENING

PART 1 – GENERAL

1.1 THE REQUIREMENT

A. Furnish all materials, labor, and equipment required to provide all metal welds and fasteners not otherwise specified, in accordance with the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05010 - Metal Materials

B. Section 05035 - Galvanizing

C. Section 05061 – Stainless Steel

D. Section 05120 - Structural Steel

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1.	Michigan Building Code	
2.	AISC	Specification for Structural Joints Using ASTM A325 or A490 Bolts.
3.	AISC	Code of Standard Practice
4.	AWS D1.1	Structural Welding Code - Steel
5.	AWS D1.2	Structural Welding Code - Aluminum
6.	AWS D1.6	Structural Welding Code – Stainless Steel
7.	Aluminum Association	Specifications for Aluminum Structures
8.	ASTM A572/A572M-94C	Standard Specification for High Strength Low-Alloy Columbium-Vanadium Structural Steel Grade 50
9.	ASTM A307	Standard Specification for Carbon Steel Externally Threaded Standard Fasteners
10.	ASTM A325	Standard Specification for High-Strength Bolts for Structural Steel Joints
11.	ASTM A489	Standard Specification for Eyebolts

12.	ASTM A490	Standard Specification for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints
13.	ASTM A563	Standard Specifications for Carbon and Alloy Steel Nuts
14.	ASTM F593	Standard Specification for Stainless Steel Bolts; Hex Cap Screws, and Studs
15.	ASTM F594	Standard Specification for Stainless Steel Nuts
16.	ASTM D1785	Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe
17.	ASTM F467	Standard Specification for Nonferrous Nuts for General Use

1.4 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Shop Drawings providing the fastener's manufacturer and type and certification of the fastener's material and capacity.

2. Copy of valid certification for each person who is to perform field welding.

3. Certified weld inspection reports, when required.

4. Welding procedures.

1.5 QUALITY ASSURANCE

A. Fasteners not manufactured in the United States shall be tested and certification provided with respect to specified quality and strength standards. Certifications of origin shall be submitted for all U.S. fasteners supplied on the project.

B. All steel welding shall be performed by welders certified in accordance with AWS D1.1. All aluminum welding shall be performed by welders certified in accordance with AWS D1.2. All stainless steel welding shall be performed by welders certified in accordance with AWS D1.6. Certifications of field welders shall be submitted prior to performing any field welds.

C. Welds and high strength bolts used in connections of structural steel will be visually inspected in accordance with Article 3.04.

D. The Owner may engage an independent testing agency to perform testing of welded connections and to prepare test reports in accordance with AWS. Inadequate welds shall be corrected or redone and retested to the satisfaction of the Engineer, Owner, and/or an acceptable independent testing laboratory, at no additional cost to the Owner.

E. Provide a welding procedure for each type and thickness of weld. For welds that are not prequalified, include a Performance Qualification Report. The welding procedure shall be given to each welder performing the weld. The welding procedure shall follow the format in Annex E of AWS D1.1 with relevant information presented.

PART 2 – PRODUCTS

2.1 ANCHOR BOLTS

A. Anchor bolts shall conform to ASTM A36 or ASTM A307 Grade A except where stainless steel or other approved anchor bolts are shown on the Drawings. Anchor bolts shall have hexagonal heads and shall be supplied with hexagonal nuts meeting the requirements of ASTM A563 Grade A.

B. Where pipe sleeves around anchor bolts are shown on the Drawings, pipe sleeves shall be cut from Schedule 40 PVC plastic piping meeting the requirements of ASTM D1785.

2.2 HIGH STRENGTH BOLTS

A. High strength bolts and associated nuts and washers shall be in accordance with ASTM A325 or ASTM A490. Bolts, nuts and washers shall meet the requirements of AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

B. Where high strength bolts are used to connect galvanized steel or are otherwise specified to be galvanized, bolts, nuts, and washers shall be hot-dip galvanized in accordance with ASTM A325.

2.3 STAINLESS STEEL BOLTS

A. Stainless steel bolts shall conform to ASTM F-593. All underwater fasteners, fasteners in confined areas containing fluid, and fasteners in corrosive environments shall be Type 316 stainless steel unless noted otherwise. Fasteners for aluminum and stainless steel members not subject to the above conditions shall be Type 304 stainless steel unless otherwise noted.

B. Stainless steel bolts shall have hexagonal heads with a raised letter or symbol on the bolts indicating the manufacturer, and shall be supplied with hexagonal nuts meeting the requirements of ASTM F594. Nuts shall be of the same alloy as the bolts.

2.4 CONCRETE ANCHORS

A. All concrete anchors shall be adhesive anchors.

1. Adhesive anchors shall be two part injection type.

B. Adhesive anchors shall consist of stainless steel threaded rods or bolts anchored with an adhesive system into hardened concrete or grout-filled masonry. The adhesive system shall use a two-component adhesive mix and shall be injected with a static mixing nozzle following manufacturer's instructions. Thoroughly clean drill holes of all debris and drill dust with wire brush prior to installation of adhesive and threaded rod/bolt. Wipe rod free from oil that may be present from shipping or handling. The embedment depth of the rod/bolt shall provide a minimum allowable bond strength that is equal to the allowable tensile capacity of the rod/bolt (see Table 1) unless noted otherwise on the Drawings. The adhesive system shall be “Epcon System A7, C6, or G5” as manufactured by ITW Ramset/Redhead, "HIT HY-150 or RE-500 Injection Adhesive Anchor System" as manufactured by Hilti, Inc.

C. Concrete anchors used to anchor aluminum, FRP, or stainless steel shall be Type 304 stainless steel unless noted otherwise. All underwater concrete anchors shall be Type 316 stainless steel.

TABLE 1
ALLOWABLE TENSILE CAPACITY (KIPS)

Size	A36 Threaded Rod/Bolt	SST Threaded Rod/Bolt
3/8"	2.1	1.9
1/2"	3.8	3.5
5/8"	5.9	5.6
3/4"	8.4	8.2
7/8"	11.5	11.4
1"	15.0	15.0

2.5 MASONRY ANCHORS

A. Anchors for fastening to solid or grout-filled masonry shall be stainless steel adhesive anchors as specified above for concrete anchors.

B. Anchors for fastening to hollow masonry or brick shall be adhesive anchors consisting of threaded rods or bolts anchored with an adhesive system dispensed into a screen tube inserted into the masonry. The adhesive system shall use a two-component adhesive mix and shall inject into the screen tube with a static mixing nozzle. Thoroughly clean drill holes of all debris and drill dust with nylon (not wire) brush prior to installation of adhesive and anchor. Contractor shall follow manufacturer's installation instructions. The adhesive system shall be "Epcon System A7, C6, or G5" as manufactured by ITW Ramset/Redhead, "HIT HY-20 System" as manufactured by Hilti, Inc., or "SET/ET Epoxy-Tie" or "AT Acrylic-Tie" as manufactured by Simpson Strong-Tie Co.

C. Masonry anchors used to anchor aluminum, FRP, or stainless steel shall be Type 304 stainless steel unless noted otherwise. All underwater anchors shall be Type 316 stainless steel.

2.6 WELDS

A. Electrodes for welding structural steel and all ferrous steel shall comply with AWS Code, using E70 series electrodes for shielded metal arc welding (SMAW), or F7 series electrodes for submerged arc welding (SAW).

B. Electrodes for welding aluminum shall comply with the Aluminum Association Specifications and AWS D1.2.

C. Electrodes for welding stainless steel and other metals shall comply with AWS D1.6.

2.7 WELDED STUD CONNECTORS

A. Welded stud connectors shall conform to the requirements of AWS D1.1 Type C.

2.8 EYEBOLTS

A. Eyebolts shall conform to ASTM A489 unless noted otherwise.

2.9 HASTELLOY FASTENERS

A. Hastelloy fasteners and nuts shall be constructed of Hastelloy C-276.

2.10 ANTISEIZE LUBRICANT

A. Antiseize lubricant shall be Graphite 50 Anti-Seize by Loctite Corporation, 1000 Anti-Seize Paste by Dow Corning, 3M Lube and Anti-Seize by 3M, or equal as approved by Engineer and Owner.

PART 3 – EXECUTION

3.1 MEASUREMENTS

A. The Contractor shall verify all dimensions and review the Drawings and shall report any discrepancies to the Engineer for clarification prior to starting fabrication.

3.2 BOLT INSTALLATION

A. Anchor Bolts, Concrete Anchors, and Masonry Anchors

1. Anchor bolts shall be installed in accordance with AISC "Code of Standard Practice" by setting in concrete while it is being placed and positioned by means of a rigidly held template.

2. The Contractor shall verify that all concrete and masonry anchors have been installed in accordance with the manufacturer's recommendations and that the capacity of the installed anchor meets or exceeds the specified safe holding capacity.

3. Concrete anchors shall not be used in place of anchor bolts without Engineer's approval.

4. All stainless steel threads shall be coated with antiseize lubricant.

B. High Strength Bolts

1. All bolted connections for structural steel shall use high strength bolts. High strength bolts shall be installed in accordance with AISC "Specification for Structural Joints, using A325 or A490 Bolts." All bolted joints shall be Type N, snug-tight, bearing connections in accordance with AISC Specifications unless noted otherwise on the Drawings.

C. Other Bolts

1. All dissimilar metal shall be connected with appropriate fasteners and shall be insulated with a dielectric or approved equal.

2. All stainless steel bolts shall be coated with antiseize lubricant.

3. Anchor bolts of ASTM F1554 Grade 36, A307, or A36 material (i.e., regular carbon steel bolts) should have only a nominal preload applied. It is recommended that they be tightened to a snug tight condition. Snug tight is defined as tightness attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench.

3.3 WELDING

A. All welding shall comply with AWS Code for procedures, appearance, quality of welds, qualifications of welders and methods used in correcting welded work.

B. Welded stud connectors shall be installed in accordance with AWS D1.1.

3.4 INSPECTION

A. High strength bolting will be visually inspected in accordance with AISC "Specification for Structural Joints Using A325 or A490 Bolts." Rejected bolts shall be either replaced or retightened as required.

B. Field welds will be visually inspected in accordance with AWS Codes. Inadequate welds shall be corrected or redone as required in accordance with AWS Codes.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 – GENERAL

1.1 THE REQUIREMENT

A. Furnish all equipment, labor, materials, and services required to provide all structural steel work in accordance with the Contract Documents. The term "structural steel" shall include items as defined in the AISC "Code of Standard Practice".

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05010 - Metal Materials

B. Section 05035 - Galvanizing

C. Section 05050 - Metal Fastening

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the Specifications, all work specified herein shall conform to the applicable requirements of the following documents.

1. Michigan Building Code
2. AISC - "Code of Standard Practice".
3. AISC - "Specification for Structural Steel Buildings".
4. AISC - "Specifications for Structural Joints Using ASTM A325 or A490 Bolts".
5. AWS - "Structural Welding Code".

1.4 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Certified Mill Test Reports
2. Affidavit of Compliance with grade specified
3. Shop Drawings which include the following:
    a. Layout drawings indicating all structural shapes, sizes, and dimensions.
    b. Beam and column schedules.
    c. Detailed drawings indicating jointing, anchoring and connection details.

1.5 QUALITY ASSURANCE

A. Shop inspection may be required by the Owner at his own expense. The Contractor shall give ample notice to the Engineer and Owner prior to the beginning of any fabrication work so

that inspection may be provided. The Contractor shall furnish all facilities for the inspection of materials and workmanship in the shop, and the inspectors shall be allowed free access to the necessary parts of the work. Inspectors shall have the authority to reject any materials or work which do not meet the requirements of these Specifications. Inspection at the shop is intended as a means of facilitating the work and avoiding errors, but is expressly understood that it will in no way relieve the Contractor from his responsibility for furnishing proper materials or workmanship under this Specification.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Structural Steel

1. Structural steel for W shapes shall conform to ASTM A992 unless otherwise indicated.

2. Structural steel for S, M, and HP shapes and channels shall conform to ASTM A572 Grade 50 unless otherwise indicated.

3. Structural steel for angles and plates shall conform to ASTM A36 unless otherwise indicated.

4. Steel pipe shall be ASTM A53, Grade B.

5. HSS shall be ASTM A500, Grade B. All members shall be furnished full length without splices unless otherwise noted or accepted by the Engineer.

6. All unidentified steel will be rejected and shall be removed from the site and replaced by the Contractor, all at the expense of the Contractor.

7. Fasteners for structural steel shall be in accordance with Section 05050, Metal Fastening.

8. All structural steel shall be free from mill scale.

B. Welds

1. Electrodes for welding shall be in accordance with Section 05050, Metal Fastening.

PART 3 – EXECUTION

3.1 MEASUREMENT

A. The Contractor shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of work. The Contractor shall review the Drawings and any discrepancies shall be reported to the Engineer for clarification prior to starting fabrication.

3.2 FABRICATION

A. Fabrication shall be in accordance with the AISC "Specification for Structural Steel Buildings and AISC "Code of Standard Practice". Fabrication shall begin only after Shop Drawing approval.

B. Except where otherwise noted on the Drawings or in this Specification, all shop connections shall be welded.

C. All holes in structural steel members required for anchors, anchor bolts, bolt holes, sag rods or other members or for attachment of other work shall be provided by the fabricator and detailed on the Shop Drawings.

D. All materials shall be properly worked and match-marked for field assembly.

E. Where galvanizing of structural steel is required, it shall be done in accordance with Section 05035, Galvanizing.

3.3 DELIVERY, STORAGE AND HANDLING

A. Structural members shall be loaded in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.

B. Structural steel members and packaged materials shall be protected from corrosion and deterioration. Material shall be stored in a dry area and shall not be placed in direct contact with the ground. Materials shall not be placed on the structure in a manner that might cause distortion or damage to the members or the supporting structures. The Contractor shall repair or replace damaged materials or structures as directed.

3.4 ERECTION

A. The erection of all structural steel shall conform to the applicable requirements of the AISC "Specification for Structural Steel Buildings" and AISC "Code of Standard Practice". All temporary bracing, guys and bolts as may be necessary to ensure the safety of the structure until the permanent connections have been made shall be provided by the Contractor.

B. Structural members shall be set accurately to the lines and elevations indicated. The various members shall be aligned and adjusted to form a part of a complete frame or structure before permanently fastened.

C. No cutting of structural steel members in the field will be allowed except by the written approval of the Engineer.

D. Bearing surfaces and other surfaces which will be in permanent contact shall be cleaned before assembly.

E. Field welding shall not be permitted unless specifically indicated in the Drawings or approved in writing by the Engineer. All field welding shall comply with Section 05050, Metal Fastening.

F. All bolted connections shall use high strength bolts in accordance with Section 05050, Metal Fastening. Bolts shall be fully pretensioned according to the AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

G. All field connections shall be accurately fitted up before being bolted. Drifting shall be only such as will bring the parts into position and shall not be sufficient to enlarge the holes or to distort the metal. All unfair holes shall be drilled or reamed.

H. Misfits at Bolted Connections

1. Where misfits in erection bolting are encountered, the Engineer shall be immediately notified. The Contractor shall submit a method to remedy the misfit for review by the

Engineer. The Engineer will determine whether the remedy is acceptable or if the member must be refabricated.

2. Incorrectly sized or misaligned holes in members shall not be enlarged by burning or by the use of drift pins. The Contractor shall notify the Engineer immediately and shall submit a proposed method of remedy for review by the Engineer.

3. Where misalignment between anchor bolts and bolt holes in steel members are encountered, the Engineer shall be immediately notified. The Contractor shall submit a method to remedy the misalignment for review by the Engineer.

I. Grouting of Base Plates and Bearing Plates

1. The bottom surface of the plates shall be cleaned of all foreign materials, and concrete or masonry bearing surface shall be cleaned of all foreign materials and roughened to improve bonding.

2. Accurately set all base and bearing plates to designated levels with steel wedges or leveling plates.

3. Baseplates shall be grouted with non-shrink grout to assure full uniform bearing. Grouting shall be done prior to placing loads on the structure.

4. Anchor bolts shall be tightened after the supported members have been positioned and plumbed and the non-shrink grout has attained its specified strength.

J. Where finishing is required, assembly shall be completed including bolting and welding of units before start of finishing operations.

3.5 PAINTING

A. Painting shall be performed according to Section 09900, Painting and the following additional requirements.

1. Concrete Encased Steel: Steel members which will be encased in concrete shall be cleaned and coated in rust inhibiting coating, SikaTop ArmaTec 110 Epo-Cem by Sika, prior to encasement.

2. Contact Surfaces: Contact surfaces such as at field connections, shall be cleaned and primed but not painted.

3. Finished Surfaces: Machine finished surfaces shall be protected against corrosion by a rust-inhibiting coating which is easily removed prior to erection or which has characteristics that make removal unnecessary prior to erection.

4. Surfaces Adjacent to Field Welds: Surfaces within 2 inches of any field weld location shall be free of materials that would prevent proper welding or produce objectionable fumes while welding is being done.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. It is the intent of this Section that all painting necessary to result in a complete, finished appearing facility be accomplished. As part of the work of this Section, prepare surfaces that are to be painted and furnish and apply paint materials. Paint schedules follow the text of this Section and define the surface preparation and coating systems required to paint the various types of surfaces that are to be painted. The Paint Application Table below identifies the areas to receive the paint systems specified in the paint schedules. For items or areas not listed in the Paint Application Table, consult the ENGINEER for the proper system to be used. Exclusion from the Paint Application table does not necessarily indicate that an item or area does not require painting.

B. Acceptable manufacturer shall be Tnemec.

C. Coordinate all work with Lead Based Paint Abatement as required.

D. Paint Application Table

Schedule M1: Existing Interior Metal

Paint the following interior metal items: structural steel where indicated on the Contract Drawings; exposed surfaces resulting from selective demolition activities.

Pretreatment (Schedule M2) followed by touch-up painting of damaged galvanizing on galvanized metal items with a zinc-rich primer shall be performed before application of paint.

Choice of colors required.

Schedule M2: Pretreatment of Galvanized and Nonferrous Metals

Pretreating is required on copper and galvanized pipe, aluminum, items in contact with concrete or dissimilar metals, and on damaged galvanizing of galvanized metal items prior to touch-up painting. Pretreating is not required on galvanized steel, aluminum or other nonferrous materials for items that do not require touch-up painting or are not specified to be painted.

Schedule M3: New Interior Metal

Paint the following interior metal items: structural steel where indicated on the Contract Drawings.

Pretreatment (Schedule M2) followed by touch-up painting of damaged galvanizing on galvanized metal items with a zinc-rich primer shall be performed before application of paint.

Choice of colors required.

E. In addition to the painting indicated in the above Paint Application Table, paint all aluminum surfaces that will be in contact with dissimilar metals using two coats of the prime coat specified for Exterior Metal. Coordinate painting with the fabrication of components and with the work of other trades so as to ensure the full and correct application of paint materials.

F. In addition to the painting indicated in the above Paint Application Table, apply touch-up paint to finish defects and field cuts, welds, and penetrations of galvanized metal. Prepare and pretreat surfaces in accordance with Schedule M2 above and finish paint according to the appropriate paint schedule.

G. Prime and finish painting, regardless of the location in which the work is performed, shall conform to all requirements of this Section. Coordinate painting with the fabrication of components and with the work of other trades so as to ensure the full and correct application of paint materials.

1.2 DEFINITIONS

A. For the purposes of this Section, the following definitions apply: "Exposed to View" means all surfaces in the final work that could be seen from any vantage point from any height. "Paint" means all pretreatment, prime, intermediate and final coatings specified herein including clear, translucent and opaque materials.

1.3 QUALITY ASSURANCE

A. Applicator's Quality Assurance: Submit list of a minimum of 3 completed projects of similar size and complexity to this Work completed within the last 5 years. Projects shall demonstrate experience working on comparable structures. Include for each project:

1. Project name and location.

2. Name of project Owner, include a contact name and phone number.

3. Name of General Contractor is different than Contractor holding this contract.

4. Name of Engineer, include a contact name and phone number.

5. Name of coating manufacturer.

6. Approximate area of coatings applied.

7. Date of completion.

B. Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces. In the acceptance or rejection of installed painting, no allowance will be made for lack of skill on the part of painters.

C. Apply paints following the recommendations in the "Applications Manual for Paint and Protective Coatings" published by McGraw-Hill.

1.4 FIELD QUALITY CONTROL

A. Inspector's Services: The Contractor shall hire Dixon Engineering or Nelson Tank (third party satisfactory to the Owner), at no additional expense to the Owner, to perform field inspections of items below and prepare the field inspection reports described in item 5 below:

1. Verify coatings and other materials are as specified.

2. Verify surface preparation and applications are as specified.

3. Visually inspect all welds prior to coating.

4. Measure and monitor environmental conditions for painting including humidity, temperature, dew point, surface temperature, etc.

5. Verify DFT of each coat and total DFT of each coating systems are as specified using wet film and dry film gauges.

6. Coating Defects: Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.

7. Report:

   a. Submit written reports describing inspections made and actions taken to correct nonconforming work.

   b. Report nonconforming work no corrected.

   c. Submit copies of report to Owner and Contractor.

1.5 SUBMITTALS

A. Provide submittals in accordance with Division 1 of the Specifications. Prior to ordering and delivering paint materials to the project site, submit the following:

   1. Manufacturer literature demonstrating compliance with these Specifications and indicating paint formulation, rate of coverage, recommended uses and recommended application method.

   2. Color chips for the full range of colors available in each product.

B. The paint products indicated in these Specifications establish the required standard of paint quality. Requests for substitution will not be considered.

1.6 PRODUCT HANDLING

A. Deliver all paint materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store only the approved materials at the job site. Store them in a suitable and designated area restricted to the storage of paint materials and related equipment. Use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste. Store volatile solvents, rags and cleaning materials in a well ventilated area.

B. Use all means necessary to protect paint materials before, during, and after application and to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the OWNER.

1.7 EXTRA STOCK

A. Upon completion of the work of this Section, deliver to the OWNER an extra stock of

paint equaling approximately 2% of each color and gloss used in each coating material with all such extra stock tightly sealed in clearly labeled containers that have not been previously opened.

1.8 GUARANTEE

A. Furnish a 1-year warranty from the date of substantial completion on workmanship. Manufacturer to provide an unlimited warranty on the materials.

2.0 PRODUCTS

2.1 PAINT MATERIALS

A. Provide paint materials in accordance with the paint schedules that follow the text of this Section.

B. All paint materials for each paint system shall be the products of a single manufacturer. All paint materials and equipment shall be compatible in use: finish coats shall be compatible with prime coats, prime coats shall be compatible with the surface to be coated, and all tools and equipment shall be compatible with the coating to be applied. Thinners, when used, shall be only those thinners specifically recommended for that purpose by the manufacturer of the material to be thinned.

C. Furnish finish paint in the colors selected by the OWNER from the manufacturer's standard available colors (a minimum of 12 colors must be available for each finish paint requiring color choice). Specially mixed colors may be required to achieve OSHA approved safety colors and to provide the piping and plumbing line colors to meet the OWNER's color scheme. The City of Ann Arbor Color Coding of Piping schedule is appended to this specification for reference.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Prior to beginning the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this application may properly commence. Verify that paint finishes may be applied in strict accordance with all pertinent codes and regulations and the requirements of these Specifications. In the event of discrepancy, immediately notify the ENGINEER. Do not proceed with application in areas of discrepancy until all such discrepancies have been fully resolved. Application of paint materials shall be deemed to indicate acceptability of the existing surface conditions.

3.2 SURFACE PREPARATION

A. General

1. Prior to beginning surface preparation and painting operations, completely mask, remove, or otherwise adequately protect all hardware, accessories, machined surfaces, plates, equipment identification tags/nameplates, lighting fixtures, and all work of other trades that are not to receive the paint coating. Before applying paint, thoroughly clean and prepare all surfaces according to the specified surface preparation method. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted

surfaces.

2. Spot prime all necessary areas prior to beginning field painting.

B. Preparation of Metal Surfaces

1. Prepare metal surfaces for painting by following the method indicated on the appropriate paint schedule. Preparation methods are referenced to the Steel Structures Painting Council (SSPC) Specifications. Do not prepare metal for painting when the relative humidity is higher than 85% or the metal is less than 5°F above the dew point. After surface preparation, thoroughly clean all surfaces of any remaining dirt, oil and grease and leave it ready to receive prime paint.

3.3 PAINT APPLICATION

A. Apply paint in accordance with paint schedule requirements, the cited reference, all codes and regulations, and the recommendations of the paint manufacturer. Apply prime paint to metal surfaces within 24 hrs after surface preparation. Do not apply paint in areas where dust is being generated.

B. Do not apply paint when the surrounding air temperature as measured in the shade is below 40°F or when the temperature of the surface to be painted is below 35°F. Do not apply paint when it is expected that the relative humidity will exceed 85% or that the air temperature will drop below 40°F within 18 hrs after the application of paint. Dew or moisture condensation should be anticipated and if such conditions are prevalent, delay painting until certain that the surfaces can be kept above the dew point. Follow all additional environmental limitation requirements of the paint manufacturer.

C. Paint material mil thicknesses and numbers of coats that are indicated in the paint schedules are based on brush or roller application. Spray application of paint materials will be allowed in the field only for areas or surfaces that are very difficult to paint with brush or roller. Field spray application must be approved by the ENGINEER before its initiation. For areas that are spray painted, apply as many coats as necessary to achieve specified mil thicknesses.

D. Allow sufficient drying time between coats of paint. During adverse weather, extend length of drying time as recommended by the paint manufacturer.

E. Prior to applying each paint coating after the first, check mil thickness of previously applied coating(s). Correct for insufficient paint thickness by increasing the mil thickness of subsequent applications, if allowed by the paint manufacturer or by applying additional coatings to provide the specified paint thickness.

F. Spot sand between coatings to remove paint defects visible to the unaided eye from a distance of five feet.

G. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with AWWAD 102.

H. Paint system for the concrete floors shall not be applied until all other work by other trades is complete.

3.4 CLEAN UP

A. During the progress of the work, do not allow the accumulation of empty containers or other excess items except in areas specifically set aside for that purpose. Following

completion of painting in each area, promptly remove all masking and temporary protection. After paint has dried, reinstall all items removed for painting. Upon completion of this portion of the work, visually inspect all surfaces and remove paint and traces of paint from surfaces not scheduled to be painted.

SCHEDULES FOLLOW

SERVICE: EXISTING INTERIOR METAL

Surface Preparation: **SSPC-SP3 Power Tool Cleaning – Regular Steel**
SSPC-SP11 Power Tool Cleaning to Bare Metal – Steel with Moderate Active Corrosion

Paint Manufacturer	Application	Product Name	Generic Type	No. of Coats	Dry Mils/ Coat	Sq Ft Covered/ Gallon	Comments
Tnemec	Spot Primer	Omnithane Series 530	Polyamide Epoxy	one	2-3		
Tnemec	Intermediate Coat	Tneme-Fascure Series 161	Polyamide Epoxy	one	3-5		
Tnemec	Finish	Endura-Shield II Series 1074	Acrylic Polyurethane	one	2-3		

Surface Preparation:	**Prepare surfaces by sanding, abrading or using Clean N Etch as manufactured by Great Lake Laboratories or owner approved equal. SSPC-SP1 Solvent Cleaning**

For all galvanized items that require touch-up painting, pretreat items as indicated in the surface preparation, then apply a zinc-rich primer to all areas requiring touch up.

For galvanized and non-ferrous metal items to be painted following pretreatment and touch-up, refer to other schedules for painting.

SERVICE: INTERIOR METAL

Surface Preparation: **SSPC-SP6 Commercial Blast Cleaning**

Paint Manufacturer	Application	Product Name	Generic Type	No. of Coats	Dry Mils/ Coat	Sq Ft Covered/ Gallon	Comments
Tnemec	Shop Primer	F.C. Typoxy Series 27	Polyamide Epoxy	one	4-6		
Tnemec	Field Primer	F.C. Typoxy Series 27	Polyamide Epoxy	touch-up	4-6		
Tnemec	Finish	H.B. Tneme-Tufcoat Series 114	Waterborne Acrylic Epoxy	one	4-6		Series 114 - Gloss

SECTION 13120

METAL BUILDING SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Metal Building System:

1. Metal roof retrofit system.

2. Metal wall system with interior liner panels.

3. Roof and wall insulation systems.

B. Extent of metal roof system as indicated on drawings and by provisions of this section and is defined to include, but not limited to, metal roof panels, roof insulation, eave and gable trim, gutters and downspouts, sealants, fasteners and miscellaneous flashings, closures and accessories directly related to the metal roof system.

C. Extent of metal wall system as indicated on drawings and by provisions of this section and is defined to include, but limited to, metal wall panels, metal interior wall liner panels, wall insulation, flashing, trim, fasteners, sealants, closures, penetration flashings and accessories directly related to the metal wall system.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. American Institute of Steel Construction (AISC):

1. AISC Specification for Structural Steel Buildings.

2. AISC Serviceability Design Considerations for Low-Rise Buildings.

B. American Iron and Steel Institute (AISI):

1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

C. American Welding Society (AWS):

1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.

2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel.

D. Association for Iron & Steel Technology (AISE):

1. AISE 13 – Specifications for Design and Construction of Mill Buildings.

E. ASTM International (ASTM):

1. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

2. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

3. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

4. ASTM B 117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.

5. ASTM C 518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

6. ASTM C 1363 – Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.

7. ASTM D 522 – Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.

8. ASTM D 523 – Standard Test Method for Specular Gloss.

9. ASTM D 968 – Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.

10. ASTM D 1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

11. ASTM D 2244 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.

12. ASTM D 2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

13. ASTM D 2794 – Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

14. ASTM D 3361 – Standard Practice for Unfiltered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

15. ASTM D 4214 – Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

16. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

17. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.

18. ASTM E 1592 – Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

19. ASTM G 87 – Standard Practice for Conducting Moist SO2 Tests.

F. FM Global:

1. FMRC Standard 4471 – Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.

G. The Society for Protective Coatings (SSPC):

1. SSPC-Paint 15 - Primer for Use Over Hand Cleaned Steel performs to SSPC-Paint 15 standards.

2. SSPC-SP2 – Hand Tool Cleaning.

H. Underwriters Laboratories (UL):

1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies.

2. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials.

1.3 PREINSTALLATION MEETINGS

A. Convene preinstallation meeting 2 weeks before start of installation of metal building system.

B. Require attendance of parties directly affecting work of this section, including Contractor, Engineer, installer, and metal building system manufacturer's representative.

C. Review materials, installation, protection, and coordination with other work.

1.4 SUBMITTALS

A. Comply with Section 0133 00 – Submittal Procedures.

B. Product Data: Submit metal building system manufacturer's product information, specifications, and installation instructions for building components and accessories.

C. Erection Drawings: Submit metal building system manufacturer's erection drawings, including plans, elevations, sections, and details, indicating roof framing, transverse cross-sections, covering and trim details, and accessory installation details to clearly indicate proper assembly of building components.

D. Certification: Submit written "Certificate of design and manufacturing conformance" prepared and signed by a Professional Engineer, registered to practice in Michigan verifying that the metal roof system design (including panels, clips, and support system components) meet indicated loading requirements and codes of authorities having jurisdiction.

E. Certification shall reference specific dead loads, live loads, snow loads, wind loads/speeds, concentrated loads, collateral loads, governing code bodies, including year, and load applications.

F. Submit certification on the metal building system manufacturer's letterhead.

G. Submit certification verifying that the metal roof system has been tested and approved by Underwriter's Laboratory as Class 90.

H. Submit certification verifying that the metal standing seam roof system has been tested in accordance with ASTM E 1592 test protocols.

I. Dealer Certification: Submit certification as part of bid that the metal building system supplier or metal roof system supplier is a manufacturer's authorized and franchised dealer of the system to be furnished.

J. Certification shall state date on which authorization was granted.

K. Installer Certification: Submit certification as part of bid that the metal building system or roof system installer has been regularly engaged in the installation of building systems of the same or equal construction to the system specified.

L. Warranty Documentation: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer regularly engaged, for past 10 years, in manufacture of metal building systems of similar type to that specified.

2. Accredited based on IAS Accreditation Criteria AC472 and requirements in International Building Code (IBC), Chapter 17.

B. Installer's Qualifications:

1. Installer regularly engaged, for past 10 years, in installation of metal building systems of similar type to that specified.

2. Employ persons trained for installation of metal building systems.

C. Certificate of design and manufacturing conformance:

1. Metal building system manufacturer shall submit written certification prepared and signed by a Professional Engineer, registered to practice in Michigan verifying that metal roof system design (including panels, clips, and support system components) meet indicated loading requirements and codes of authorities having jurisdiction.

2. Certification shall reference specific dead loads, live loads, snow loads, wind loads/speeds, tributary area load reductions (if applicable), concentrated loads, governing code bodies, including year, and load applications.

3. Certificate shall be on metal building system manufacturer's letterhead.

4. Refer to Submittals article of this specification section.

D. Material Testing:

1. In addition to material certifications of structural steel, metal building system manufacturer shall provide, upon request at time of order, evidence of compliance with specifications through testing.

2. This quality assurance testing shall include testing of structural bolts, nuts, screw fasteners, mastics, and metal coatings (primers, metallic coated products, and painted coil products).

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:

1. Store and handle materials in accordance with manufacturer's instructions.

2. Keep materials in manufacturer's original, unopened containers and packaging until installation.

3. Do not store materials directly on ground.

4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.

5. Protect materials and finish during storage, handling, and installation to prevent damage.

1.8 WARRANTY

A. Metal roof system manufacturer shall provide a written weathertightness warranty for a minimum of 20 years against leaks in roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.

1. Warranty shall be signed by both the metal roof system manufacturer and the metal roof system installer.

B. Metal roof system manufacturer shall provide a written warranty for 20 years against perforation of metal roof panels due to corrosion under normal weather and atmospheric conditions.

1. Warranty shall be signed by metal roof system manufacturer.

C. Metal roof system manufacturer shall provide a paint film written warranty for 20 years against cracking, peeling, chalking, and fading of exterior coating on painted roof and wall panels.

1. Warranty shall be signed by metal roof system manufacturer and state that the coating contains 70 percent "Kynar 500" or "Hylar 5000" resin.

2. Metal building system manufacturer shall warrant that the coating shall not peel, crack, or chip for 20 years.

3. For a period of 20 years, chalking shall not exceed ASTM D 4214, #8 rating and shall not fade more than 5 color difference units in accordance with ASTM D 2244.

D. Metal Roof System Manufacturer's Certification: Metal roof system manufacturer shall submit a signed written Certification as part of the bid, stating that the metal roof system manufacturer or approved representative will provide warranties and Inspection and Report Service specified in this specification section.

1. Warranty terms shall be submitted with bid.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Metal Roof System Manufacturer:

1. Butler Manufacturing, PO Box 419917, Kansas City, Missouri 64141. Phone 816-968-3000. Website www.butlermfg.com.

2. Tremco, Inc., Beachwood, OH, (800) 562-2728, www.tremcoroofing.com

3. Or approved equal.

2.2 BUILDING DESCRIPTION

A. Metal Roof System: High profile metal over metal roof retrofit system as specified in this specification section.

B. Metal Wall System: Metal wall system with liner panels as specified in this specification section.

C. Where metal panels are required to be painted, use coating system as specified in this specification section.

D. Sheet Metal Accessories: Facia, trim, gutters and downspouts.

2.3 DESIGN LOADS

A. Governing Design Code:

1. Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:

2. Governing Building Code: International Building Code.

3. Year/Version: 2009

4. Occupancy Category: Group A

B. Roof Snow Load:

1. Roof snow load used for designing the structure shall not be reduced and shall be the product of the following criteria:

2. Snow Load Coefficient (Ce): 0.9.

3. Thermal Factor (C_t): 1.0.

4. Snow Importance Factor (I): 1.1.

5. Ground Snow Load (Pg): 20.

6. Roof Snow Load (Pf): 13 psf.

7. Design snow load shall include the effects of minimum flat roof load limits, rain on snow, drifting snow, and unbalanced snow load as defined in the governing building code specified above.

C. Wind Load:

1. Wind load used for designing the structure shall be the product of the following criteria:

2. Wind Exposure Category: C.

3. Wind Topographic Factor (K_{zt}): 1.0

4. Wind Velocity (V), miles per hour: 90 mph (ASCE7-98).

5. Wind Importance Factor (I_w): 1.15.

D. Wind Pressure Coefficients and the design pressures shall be applied in accordance with the governing code.

E. Dead Load: Dead load shall consist of the weight of roofing system construction including solar panels/collectors that could be installed in the future.

F. Load Combinations: Load combinations used to design primary and secondary structural members shall be in accordance with the governing code.

2.4 DEFLECTIONS

A. Structural Members:

1. Maximum deflection due to snow load in roof panels and purlins shall not exceed 1/240 of their respective spans.

2. Maximum deflection due to wind load in wall panels and girts shall not exceed 1/240 of their respective spans.

2.5 METAL OVER METAL ROOF RETROFIT SYSTEM

A. Metal Roof System:

1. Butler Manufacturing "MR-24®" roof system.

2. Tremco TremLock LSP roof system.

3. Or approved equal.

B. Roof System Design:

1. Design roof panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

2. Design roof paneling system for a minimum roof slope of 1/4 inch in 12 inches.

3. Design roof paneling system to support design live, snow, and wind loads.

4. Endwall Trim and Roof Transition Flashings: Allow roof panels to move relative to wall panels and/or parapets as roof expands and contracts with temperature changes.

C. Roof System Performance Testing:

1. UL Wind Uplift Classification Rating, UL 580: Class 90.

2. Structural Performance Under Uniform Static Air Pressure Difference: Test roof system in accordance with ASTM E 1592.

3. Roof system has been tested in accordance with U.S. Army Corps of Engineers Unified Facilities Guide Specification Section 07 61 13.

4. FM Global (Factory Mutual):

a. Roof system has been tested in accordance with FMRC Standard 4471 and approved as a Class 1 Panel Roof.

b. Metal Building System Manufacturer: Provide specific assemblies to meet required wind rating in accordance with FM Global.

c. Installation modifications or substitutions can invalidate FM Global approval.

D. Roof Panels:

1. Factory roll-formed, 24 inches wide, with 2 major corrugations, 2 inches high (2-3/4 inches including seam), 24 inches on center.

2. Flat of the Panel: Cross flutes 6 inches on center, perpendicular to major corrugations in entire length of panel to reduce wind noise.

3. Variable Width Panels:

a. For roof lengths not evenly divisible by the 2'-0" panel width, factory-manufactured variable-width (9-inch, 12-inch, 15-inch, 18-inch, and 21-inch-wide) panels shall be used to ensure modular, weathertight roof installation.

b. Minimum Length: 15 feet.

c. Supply maximum possible panel lengths.

4. Panel Material and Finish:

a. 24 gauge steel coating both sides with layer of acrylic-coated Galvalume aluminum-zinc alloy (approximately 55 percent aluminum, 45 percent zinc) applied by continuous hot-dip method.

b. Paint with exterior colors of "Butler-Cote™" (or approved equal) finish system, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating.

c. PVDF Coating Warranty: Metal roof/building system manufacturer shall warrant coating for 20 years for the following.

i. Not to peel, crack, or chip.

ii. Chalking: Not to exceed ASTM D 4214, #8 rating.

iii. Fading: Not more than 5 color-difference units, ASTM D 2244.

5. Use panels of maximum possible lengths to minimize end laps.

6. Extend eave panels beyond structural line of sidewalls.

7. Factory punch panels at panel end to match factory-punched holes in eave structural member.

8. Panel End Splices: Factory punched and factory notched.

9. Panel End Laps: Locate directly over, but not fastened to, a supporting secondary roof structural member and be staggered, to avoid 4-panel lap-splice condition.

10. End Laps: Floating. Allows roof panels to expand and contract with roof panel temperature changes.

11. Self-Drilling Fasteners: Not permitted.

12. Ridge Assembly:

a. Design ridge assembly to allow roof panels to move lengthwise with expansion and contraction as roof panel temperature changes.

b. Factory punch parts for correct field assembly.

c. Install panel closures and interior reinforcing straps to seal panel ends at ridge.

d. Do not expose attachment fasteners on weather side.

e. Use lock seam plug to seal lock seam portion of panel.

f. High-Tensile Steel Ridge Cover: Span from panel closure to panel closure and flex as roof system expands and contracts.

E. Provision for Expansion and Contraction:

1. Provision for Thermal Expansion Movement of Roof Panels: Clips with movable tab.

a. Stainless Steel Tabs: Factory centered on roof clip when installed to ensure full movement in either direction.

b. Maximum Force of 8 Pounds: Required to initiate tab movement.

c. Each Clip: Accommodates a minimum of 1.25-inch movement in either direction.

2. Allowances for thermal expansion: Pre-Engineered metal roof system shall be designed, fabricated, and installed to allow relative movement between roof panels and purlins, gables and ridges due to thermal expansion and contraction without causing damage to the system or permanent deformation to any of the system components. Roof panel end laps shall allow panels to expand and contact without damage to end lap splices. Roof panel endlaps must be staggered to insure a continued unbroken panel through each endlap seam.

F. Retrofit Framing Components:

1. Spacer clip: 0.06 inch, height as required to space hat channel base spanning members to clear underlying roof panel ribs.

2. Spanning members: Hat shaped, rigid furring channels, thickness 0.060 inch, height as required.

3. Anchoring Fastener: 3/8" by 1 inch galvanized steel self-tapping screw with G-90 galvanized steel-backed EPDM washer, with pull-out capacity as required to meet performance requirements.

G. Fasteners:

1. Make connections of roof panels to structural members, except at eaves, with clips with movable stainless steel tabs, seamed into standing seam side lap.

2. Fasten panel clips to structural members with "ScruboltTM" fasteners (or approved equal) in accordance with erection drawings furnished by metal building system manufacturer.

a. Fasteners: Metal-backed rubber washer to serve as torque indicator.

3. Exposed fasteners penetrating metal roof membrane at the following locations do not exceed the frequency listed:

a. Basic Panel System: 0 per square foot.

b. High Eave Trim, No Parapet: 2 per linear foot.

c. Exterior Eave Gutter: 2 per linear foot.

d. Panel Splices: 2 per linear foot.

e. Gable Trim: 0 per linear foot.

f. High Eave with Parapet: 0 per linear foot.

g. Ridge: 0 per linear foot.

h. Low Eave Structural: 1.5 per linear foot.

H. Accessories:

1. Gutters: Formed in sections not less than twenty feet in length, complete with end pieces, outlet tubes, and special pieces that may be required. Provide expansion joint with cover if required. Provide gutter supports at 48" o.c. (max.) constructed of the same metal as gutters. Provide stainless steel wire ball strainers at each outlet. Gutters shall be minimum 24-gage roll formed steel. Standard with metal building system manufacturer, unless otherwise noted and furnished as specified.

2. Downspouts: Formed in sections not less than ten feet in length complete with any special pieces that may be required. Join sections with riveted and sealed joints. Downspouts shall be 24 gage roll formed steel. Furnish to match gutter or wall panels. Gutter straps shall be spaced 8 feet on center max. and be the same material as the gutter.

3. Exterior Metal Coating on Gutters, Downspouts, Gable Trim, and Eave Trim: "Butler-CoteTM" finish system or approved equal, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating.

4. Location of Standard Accessories: Indicated on erection drawings furnished by metal building system manufacturer.

5. Material used in flashing and transition parts and furnished as standard by metal building system manufacturer may or may not match roof panel material.

   a. Parts: Compatible and not cause corrosive condition.

   b. Copper and Lead Materials: Do not use with Galvalume panels.

I. Roof Insulation:

1. Rigid Foam Board Insulation: closed cell polyisocyanurate foam board with glass fiber reinforced core to ASTM C1289, Type I, Class 2 and meeting the following criteria:

   a. Thermal Resistance: R-6.5 per inch of thickness.

2. Acceptable Manufacturers:

   a. Thermax Metal Building Board by The Dow Chemical Company,

   b. Or approved equal.

2.6 METAL WALL SYSTEM

A. Exterior Metal Wall System:

1. Butler ManufacturingTM "ShadowallTM" wall system.

2. Tremco Inc, TremLock Flexx Metal wall panel system.

3. or approved equal.

B. Wall System Design: Design wall panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

C. Wall Panels:

1. Roll-formed panels, 3 feet wide with 4 major corrugations, 1-7/16 inches high, 12 inches on center, with 2 minor corrugations between each of the major corrugations entire length of panel. 26 gauge steel coated both sides with layer of acrylic-coated Galvalume aluminum-zinc alloy (approximately 55 percent aluminum, 45 percent zinc) applied by continuous hot-dip method.

2. One piece from base to building eave.

3. Each Panel Corrugation: Fastener alignment groove to center fastener within corrugation.

4. Exposed Panel Side Laps: Hemmed to eliminate raw cut panel edge.

5. Upper End of Panels: Fabricate with mitered cut to match corrugations of roof panels of 1/2 inch to 12 inches and square cut for all other roof panels and slopes.

6. Factory punch or field drill wall panels at panel ends and match factory-punched or field-drilled holes in structural members for proper alignment.

7. Panel Material and Finish:

a. Paint with exterior colors of "Butler-Cote™" finish system or approved equal, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating.

b. PVDF Coating Warranty: Metal building system manufacturer shall warrant coating for 20 years for the following.

I. Not to peel, crack, or chip.

II. Chalking: Not to exceed ASTM D 4214, #8 rating.

III. Fading: Not more than 5 color-difference units, ASTM D 2244.

8. Panel Material and Finish: Special materials, gauges, or colors as applicable for custom designs.

D. Fasteners:

1. Wall Panel-to-Structural Connections: Torx-head "Scrubolt™" or Torx-head self-drilling screws.

2. Wall Panel-to-Panel Connections: Torx-head self-drilling screws.

3. Fastener Locations: Indicated on erection drawings furnished by system manufacturer.

4. Exposed Fasteners: Factory painted to match wall color.

E. Accessories:

1. Location of Standard Accessories: Indicated on erection drawings furnished by metal building system manufacturer.

F. Insulation Board:

1. Flat Panel Insulation Board: Nominal 1-inch rigid “Thermax” (or approved equal) glass-fiber-reinforced polyisocyanurate foam plastic core, covered with aluminum facing on both sides.

a. Mill finish aluminum exposed.

G. Metal Liner Panels:

1. General: Provide factory-formed metal liner panels designed for interior side of metal wall panel assemblies and field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for a complete installation.

2. Flush-Profile Metal Liner Panels: Solid panels formed with vertical panel edges and flat pan between panel edges; with flush joint between panels.

3. Metallic-Coated Steel Sheet: Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340); structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

4. Nominal Thickness: 22 ga./0.034 inch.

5. Exposed Finish: 2-coat fluoropolymer.

a. Color: As selected by Owner from manufacturer's full range.

6. Panel Coverage: 12 inches.

7. Panel Height: 1.0 inches.

2.7 ROOF INSULATION SYSTEM

A. Roof Insulation System: Thermax Brand insulation by The Dow Chemical Company or approved equal.

2.8 METAL COATING SYSTEM

A. Metal Coating System: Butler Manufacturing™ “Butler-Cote™” finish system a factory-applied, exterior metal coating system or approved equal.

B. Substrate Preparation:

1. AZ50 Galvalume: Factory-controlled chemical-conversion treatment.

C. Coating:

1. Material: “Fluropon”. Full-strength, 70 percent, “Kynar 500” or “Hylar 5000” fluoropolymer (PVDF) color coating.

2. After steel preparation, coat exterior exposed surface with primer and “Fluropon”.

3. Nominal Total Dry Film Thickness: 1.0 mil.

4. Interior Exposed Surfaces: Coat with polyester color coat.

5. Apply coatings to entire material dimensions of steel sheets before forming of panels.

D. Physical Characteristics of Exterior Coating:

1. Resistance to failure through cracking, checking, peeling, and loss of adhesion.

2. Measure by the following laboratory weather-simulating tests to obtain test results justifying metal building system manufacturer's 25-year warranty:

a. Humidity resistance at 100 degrees F and 100 percent relative humidity, ASTM D 2247.

b. Salt-spray resistance at 5 percent salt fog, ASTM B 117.

c. Reverse impact resistance, ASTM D 2794.

d. Resistance to accelerated weathering, Atlas Model XW-R Dew Cycle Weather-O-Meter, ASTM D 3361.

e. Resistance to dry heat.

f. Abrasion resistance, ASTM D 968.

g. Chemical/acid/pollution resistance, ASTM D 1308 and G 87.

h. Maintain gloss of finish evenly over entire surface, ASTM D 523

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine area to receive metal roof system.

B. Perform field inspection and verification prior to preparing shop drawings.

3.2 INSTALLATION – METAL ROOF SYSTEM

A. Install roof system in accordance with metal building system manufacturer’s instructions at locations indicated on the Drawings.

B. Install roof system weathertight.

C. Position panel clips by matching hole in clip with factory-punched holes in secondary structural members.

D. Position and properly align panels by matching factory-punched holes in panel end with factory-punched holes in eave structural member and by aligning panel with panel clip.

E. Field seam panel side laps by self-propelled and portable electrical lock-seaming machine.

1. Machine field forms the final 180 degrees of a 360-degree Pittsburgh double-lock standing seam.

2. Factory apply side lap sealant.

F. Panel End Laps: Minimum of 6 inches, sealed with sealant (weather sealing compound), and fastened together by clamping plates.

1. Sealants: Contain hard nylon beads, which prevent mastic from flowing out due to clamping actions.

2. Join panel laps by 2-piece clamped connection consisting of a bottom reinforcing plate and a top panel strap.

3. Locate panel end laps directly over, but not fastened to, supporting secondary roof structural member and stagger, to avoid 4-panel lap-splice condition.

3.3 INSTALLATION – METAL WALL SYSTEM

A. Install wall system in accordance with metal building system manufacturer's instructions at locations indicated on the Drawings.

B. Install wall system weathertight.

C. Verify structural system is plumb before wall panels are attached.

D. Align and attach wall panels in accordance with erection drawings furnished by metal building system manufacturer.

E. Install side laps with minimum of 1 full corrugation.

F. Seal wall panels at base with metal trim and foam or rubber closures.

G. Exterior Trim: Apply same finish as exterior color of wall panels, except the following:

1. Gutters, Downspouts, Eave Trim, Gable Trim, Door-Side Flashings, and Header Flashings: Paint with exterior colors of "Butler-CoteTM" finish system, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating in standard color of metal building system manufacturer.

2. Windows: Factory paint aluminum extrusions (thermally broken).

H. Flashings, Trim, Closures, and Similar Items: Install as indicated on erection drawings furnished by metal building system manufacturer.

I. Install interior wall liner panels in accordance with manufacturer's instructions at locations as indicated on the Drawings.

3.4 INSTALLATION – SHEET METAL ACCESSORIES

A. Install gutters, downspouts and any other sheet metal accessories in accordance with manufacturer's instructions for positive anchorage to building and weathertight mounting at locations indicated on the Drawings.

3.5 INSTALLATION - INSULATION

A. Install roof insulation system in accordance with metal building system manufacturer's instructions at locations indicated on the Drawings.

3.6 PROTECTION

A. Protect installed metal building system to ensure that, except for normal weathering, metal building system will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 16010

ELECTRICAL SYSTEM GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Work Included

B. Codes and Standards

C. Drawings

D. Record Drawings

E. Operation and Maintenance Manuals

F. Site Examination

G. Utilities

H. Temporary Power

I. Storage at Site

J. Equipment and Materials

K. Workmanship and Completion of Installation

L. Cutting and Patching

M. Coordination

N. Miscellaneous

1.2 RELATED SECTIONS

A. The requirements set out in the contract documents, contract forms, general conditions, supplementary general conditions and general requirements apply to all work specified herein.

1.3 WORK INCLUDED

A. Refer to the entire set of contract documents to become familiar with the project. Contractor is responsible for all equipment mounting, conduit routing and incidental work which may be necessary because of construction requirements, whether or not they are shown on the electrical drawings.

B. The Contractor shall furnish all materials, labor, transportation, tools, permits, fees and incidentals necessary for the installation of a complete electrical system.

C. It is the intent of the contract documents to provide an installation complete in every respect. In the event that additional details or special construction are required for work indicated or specified, it shall be the responsibility of the Contractor to provide all materials and equipment which are usually furnished with such systems in order to complete the installation, whether mentioned or not.

1.4 CODES AND STANDARDS

A. All work shall be in compliance with all applicable portions of the edition recognized by the Authority Having Jurisdiction (AHJ) of the National Electrical Code (NEC), the National Electrical Safety Code (NESC) and all city and county codes and ordinances, which may or may not be specifically referenced in these contract documents. None of the terms or provisions of these contract documents shall be construed as waiving any of the rules, regulations or requirements of these authorities.

B. In any instance where these contract documents call for construction materials of a better quality or larger size than required by the codes, the provisions of the contract documents shall take precedence. The codes shall govern where violations are indicated in the construction documents. In any instance where there is a conflict between the drawings and specifications, the larger size, higher quantity or better quality shall be provided, unless the Owner's Representative directs otherwise.

1.5 DRAWINGS

A. The accompanying drawings are intended to show the general arrangement and extent of the work. The exact location and arrangement of all parts shall be determined as the work progresses to conform in the best possible manner with the surroundings and as directed by the Owner and/or Engineer.

B. If any departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted to the Owner's Representative for review. No departures shall be made without prior written acceptance of the Owner and/or Engineer.

C. Figured dimensions shall be followed without reference to scale. Where dimensions are not shown, measurements shall be scaled.

1.6 RECORD DRAWINGS

A. The Contractor shall maintain a set of electrical drawings at the job site neatly marked with all changes from the original contract drawings. This set of drawings shall not be used for construction purposes and shall be available to the Owner and/or Engineer at all times. Drawings shall be kept up to date as the job progresses and shall be delivered to the Owner and Engineer at the completion of the contract.

B. The Contract shall maintain record drawing per the requirements of Division 1.

1.7 OPERATION AND MAINTENANCE MANUALS

A. The Contractor shall furnish Operation and Maintenance manuals to the Owner and and/or Engineer per the requirements of Division 1.

1.8 SITE EXAMINATION

A. The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, and verify all dimensions in the field. The Contractor shall advise the Owner's Representative of any discrepancy at least seven days prior to bidding. The submission of bids shall be deemed evidence of the Contractor's site visit, the coordination of all existing conditions and the inclusion of all considerations for existing conditions.

1.9 UTILITIES

A. Contract Documents reflect the general location, voltage, capacity, size and manner of routing for all utilities known to be required on this project. It shall be the responsibility of the Contractor to visit the site and to meet with the Owner’s representative in order to coordinate and confirm the exact requirements for all electrical utilities, including, but not limited to, all facilities required to provide complete and operative electrical power. The bid submitted by the Contractor shall include costs for all such coordinative work as well as any and all utility company charges and/or fees.

1.10 TEMPORARY POWER

A. The Contractor shall coordinate with the Owner, and other trades involved to determine requirements for temporary power on this project. No additional charges shall be made to the Owner for wiring, connections, poles, fixtures or devices required to facilitate construction.

B. The Contractor shall provide the necessary wiring, connections, service switches, poles, wiring protective devices, lighting fixtures, lamps, outlet devices, disconnect switches, etc., as required for temporary lighting. In addition, a similar system shall be provided for the distribution of single- and three-phase power of voltage levels and adequate ampacity as required to facilitate the construction of the project. These services shall be installed in accordance with requirements of the NEC and OSHA.

1.11 STORAGE AT SITE

A. The Contractor shall not receive material or equipment at the job site until ready for installation, or until there is suitable space provided to properly protect equipment from rust, weather, humidity, dust and physical damage.

B. Store major electrical equipment (panel boards, lighting fixtures, etc.) sealed in original factory wrapping in a clean, dry and conditioned environment protected from the weather. Storage outdoors is not acceptable.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIAL

All materials shall be new and of high quality. All materials of a type for which the Underwriters' Laboratories, Inc. (UL) has established a standard shall be listed by UL and shall bear the UL label.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND COMPLETION OF INSTALLATION

A. All work shall be performed by competent electricians, skilled in their trade, and shall be executed in a thorough and substantial manner.

B. The Contractor shall be held responsible for transportation of his materials to and on the job, and for their storage and protection until the final acceptance of the job.

C. The Contractor shall be held responsible for timely placing of all conduit and outlet boxes, cabinets and other wiring devices in the walls, ceilings, slabs, beams, etc., as construction progresses.

D. Contractor shall furnish all necessary scaffolding, tackle, tools and appurtenances of all kinds, and all labor required for the safe and expeditious execution of his contract.

E. All equipment shall be installed in a manner to permit access to parts requiring service. All electrical equipment shall be installed in such a manner as to allow removal for service without disassembly of other equipment, and shall have working clearances as required by NEC. Following placement, such apparatus shall be completely protected from damage.

F. The Contractor shall, at all times, keep the premises free from accumulations of waste material and packaging debris. This debris shall be removed daily from the construction site.

3.2 CUTTING AND PATCHING

A. Where it becomes necessary to drill or cut through any floors, walls or ceilings to permit the installation of any work under this contract, or to repair any defects that may appear prior to the expiration of the warranty, such cutting shall be done under the supervision of the Owner's Representative by the Contractor. After the necessary work has been completed, the damage shall be repaired by the Contractor, who shall pay all costs of such cutting and repairing.

B. No joists, beams, girders or columns shall be cut by the Contractor without first obtaining written permission from the Owner's Representative.

C. All drilling for expansion bolts, hangers and other supports shall be done by the Contractor, subject to the approval of the Owner's Representative. Labor and materials required to replace or rebuild parts cut or injured shall be furnished at the Contractor's expense, subject to the satisfaction of the Owner's Representative.

D. All openings made in fire-rated walls, floors and ceilings shall be patched by the Electrical Contractor in a manner maintaining the original fire rating.

3.3 COORDINATION

A. The Contractor shall coordinate the work of the different trades so that interferences between equipment, structural and architectural work shall be avoided.

B. The Contractor is responsible for ensuring that all conduit sleeves are timely installed and are sealed, flashed or caulked to the satisfaction of the Owner's Representative.

3.4 MISCELLANEOUS

A. The Contractor shall furnish and install vibration isolation means for all equipment and materials furnished under this contract which may transmit perceptible noise or vibration, structure borne or air borne, to occupied areas.

B. Electrical conduit shall be isolated from all dry type transformers and rotating or reciprocating machinery with flexible metal conduit. Use lengths approximately 10 diameters in length.

END OF SECTION

SECTION 16030

EQUIPMENT INSTALLATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section specifies receiving, unloading, storing, installing, connecting electrical circuits, and placing in operation all electrical equipment, including but not limited to the following:

1. Low Voltage Digital Lighting Control Panel

2. Circuit Breakers

3. Exterior Light Fixtures

1.2 RECEIVING, STORAGE, AND HANDLING

A. Receiving: Receive, uncrate, and inspect equipment for defects or damage. If defective or damaged equipment is discovered take necessary action to repair or replace equipment. Notify Owner/Engineer if project schedule will be affected.

B. Storage: Store equipment in dry, clean, and secure area until time of installation.

C. Handling: Handle equipment in accordance with manufacturer's instructions. Use lifting points where provided to move equipment. Protect painted and machined surfaces where exposed.

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Grounding: Comply with Section 16450 for grounding requirements in addition to specific grounding methods covered in the following articles.

B. Identification: Comply with Section 16195.

C. Cleaning: Clean interior of enclosures prior to installation of components or pulling conductors.

D. Supports and Fastenings: Comply with Section 16190.

E. Enclosure Application:

1. NEMA 12 for indoor locations unless indicated otherwise on Drawings.

2. Alum NEMA 3R or stainless steel NEMA 4X for outdoor installations.

3.2 FLOOR OR PAD MOUNTED EQUIPMENT

A. General: Install floor sills, anchor bolts, shims, and hardware required to level, align, secure, and connect equipment components in accordance with manufacturer's instructions. Make electrical connections in accordance with Section 16121 for supply and load circuits and leave items in operating condition.

3.3 WALL MOUNTED EQUIPMENT

A. General:

1. Enclosures:

a. Mount enclosures plumb, level, and rigidly attached to structure.

b. Mount 1 inch off structure with top 6'-6” above finished floor.

c. Install supports in a manner to permit vertical flow of air behind enclosure.

d. Use steel supports fabricated from standard rolled structural steel shapes specified in Section 16190.

2. Wiring: Make electrical connections in accordance with Section 16121 for supply and load circuits.

B. Panelboards:

1. Enclosure: Close unused circuit positions with blanking plates.

2. Wiring: Check buses for proper insulation resistance prior to energizing.

3. Circuit Breakers: Set circuit breaker instantaneous trip adjustments to minimum setting unless designated otherwise on Drawings.

4. Flush Mounted Panelboards: From each flush mounted panelboard extends into an accessible location a 3/4 inch empty conduit for every three spare branch circuits and spaces or as shown on Drawings.

5. Application:

a. Power, Lighting and Receptacle Type Panelboards: As designated by Panelboard Schedules on Drawings.

b. Ground Fault Circuit Interrupters: Provide for 120 volt circuits supplying 15 and 20 ampere receptacles installed outdoors or as shown on Drawings.

C. Molded Case Circuit Breakers: Set adjustable instantaneous trips to minimum, unless indicated otherwise on Drawings. On magnetic breakers in combination with starters, set trips at lowest value that will permit motor starting, but not higher than 13 times motor nameplate full-load current.

D. Low Voltage Motor Controllers and Contactors in Individual Enclosures:

1. On motor circuits, connect power circuits for proper phase rotation.

2. Set circuit breaker instantaneous trips at proper value and install correct size fuses and thermal overload heater elements.

3. Check interconnection and operation of control devices, interlocks, indicating lights, and control relays. Set timers and time delay relays for correct intervals. Check controller-operating coil for correct voltage rating. Program relay settings for exterior lighting controls per manufacturer's specification and coordinate time schedules with owner.

END OF SECTION

SECTION 16111

METALLIC CONDUIT AND FITTINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Rigid metal conduit (RMC).

B. Flexible metal conduit.

C. Liquidtight flexible metal conduit.

D. Associated fittings.

1.2 QUALITY ASSURANCE

A. Furnish conduit and fittings bearing UL labels.

B. Furnish conduit and fittings bearing label of a Nationally Recognized Testing Laboratory (NRTL) as defined in OSHA Regulation 1910.7.

PART 2 - PRODUCTS

2.1 CONDUIT

A. RMC: ANSI C80.1 and UL 6, hot dipped galvanized, zinc metalized or sheradized, heavy wall, steel.

B. Flexible Conduit: Provide flexible conduit sized 1-1/4 inches and smaller that is UL approved for use as a grounding conductor.

1. Flexible Metal (Greenfield): UL 1, hot dipped or electro-galvanized steel.

2. Liquidtight Flexible Metal Conduit (Sealtite): UL 360, hot dipped or electro-galvanized steel with thermoplastic outer covering.

2.2 FITTINGS

A. Fittings: UL 514B. Provide fittings of same type by same manufacturer.

B. Conduit Bodies:

1. Zinc coated, cast malleable, ferrous metal, threaded fittings, Appleton "Form 35 Unilets" or Crouse-Hinds "Form 7 Condulets."

2. Conduits 1-1/4 Inch and Larger: Cast malleable or aluminum "Mogul" size bodies.

3. Gaskets: Where installed outdoors or in areas with gasketed enclosures, furnish neoprene cover gasket.

C. Insulated Bushings:

1. Thermoplastic: Appleton "BBU," O-Z/Gedney "IB," or Thomas & Betts "510" Series.

2. Thermosetting Phenolic: O-Z/Gedney "A."

3. Grounding: O-Z/Gedney "BLG."

D. Flexible Connectors: Flexible conduit fittings sized 1-1/4 inches and smaller shall be UL approved for use as a grounding device.

1. Metal: Thomas & Betts "3100" series "Tite Bite," insulated.

2. Liquidtight Metal: Thomas & Betts "5200/5300" series or Appleton "ST" series, insulated.

E. Sealing Hubs: Appleton "HUB" or "HUB-U" series or Thomas & Betts "370" series.

F. Expansion Fittings:

1. Exposed: O-Z/Gedney type "AX" or "EX" or Appleton type "XJ" with bonding jumper.

2. Concrete Embedded: O-Z/Gedney "DX."

G. Unions: Appleton type "EC" or Thomas & Betts "670/680" series "Erickson" coupling.

H. Seals: Provide seals with interior cross section to allow 40% wire fill capacity.

1. Enclosure Termination and Stub-ups Into Switchboards, Distribution Panels, and Other Similar Locations: O-Z/Gedney "CSB" series sealing bushing.

2. "In-Line": Gasketed "C" conduit body, filled with Dow Corning "Fire Stop" sealant.

3. Miscellaneous Fittings: Locknuts, caps, plugs, reducers, elbows, and other accessories required for a complete installation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Do not make unnecessary bends or offsets.

2. Do not heat conduits for making bends or bend conduit through more than 90 degrees of arc.

3. Install conduits so that vertical runs are plumb and horizontal runs are level and parallel or perpendicular to principal structural features.

4. Maintain 6-inch clearance from steam lines, hot water lines, flues, and other heat producing lines or devices where practicable.

5. Make up joints tight and do not use running threads.

6. Clean inside of conduits and swab dry before installing conductors.

7. Support conduits 2-1/2" and smaller in accordance with NEC. For conduits 3" and larger support at intervals of 10'-0" or less.

B. Bending Radius: Comply with NEC 344.24 for minimum bending radius on both field bends and factory bends.

C. Concrete Embedded: Anchor conduit to reinforcing in concrete; plug or cap open ends until concrete and masonry operations are completed.

D. Below Grade: Encase conduits installed below grade in a 2-inch concrete envelope unless noted otherwise on Drawings.

E. Conduit Terminations (RMC):

1. NEMA 1 Areas: one interior and one exterior locknut with thermoplastic bushing.

2. Gasketed Enclosure Areas: One interior locknut and one exterior-sealing locknut with appropriate type bushing.

3. Outdoor Areas: Use sealing hubs in top and sides of enclosures. Use an exterior locknut, interior sealing locknut, and bushing in bottom of enclosures.

4. Service Entrances and Circuits above 600 Volts: Same as specified for NEMA 12 areas except use grounding bushing.

F. Expansion Fittings: Furnish for building expansion joints where conduit is rigidly attached to building structure or rod supported within 18 inches of structure.

G. Seals: Install seals where conduit passes from a conditioned space into an unconditioned space, in enclosures mounted outdoors, and in conduits entering structures from outside or underground.

3.2 APPLICATION

A. RMC :

1. Below grade, under load bearing concrete slabs and asphalt roadways unless concrete encased.

2. Below grade sweeps up to finish floor or grade.

3. Above-grade areas subject to physical damage.

4. Do not use RMC conduit smaller than 3/4 inch.

B. Flexible Metal Conduit: Use for final connection to vibrating equipment, enclosed transformers, lay-in lighting fixtures, lighting fixtures with flexible supports, and equipment or devices requiring adjustment, such as motors and limit switches.

1. Greenfield:

a. Indoor areas where gasketed enclosures are not required.

2. Liquidtight:

   a. Outdoor areas.

   b. Where gasketed enclosures are required.

END OF SECTION

SECTION 16121

LOW VOLTAGE COPPER WIRE AND CABLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section specifies copper wire, cable, associated connectors, and termination hardware used on systems operating at 600 volts or less.

1.2 QUALITY ASSURANCE

A. Furnish wire, cable, associated connectors, and termination hardware bearing UL label.

B. Furnish wire, cable, associated connectors, and termination hardware bearing the label of, or listed by a Nationally Recognized Testing Laboratory (NRTL) as defined in OSHA Regulation 1910.7.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Soft drawn, annealed copper, Class "B" stranding.

2.2 POWER WIRE AND CABLE

A. Acceptable Manufacturers: Single source manufacture is required for power wire and cable specified in this Section.

B. General: Conform to UL 83 and NEMA WC 5.

1. Single Conductor: Type THWN-THHN (75^{o}C wet/90^{o}C dry) or XHHW (75^{o}C wet/90^{o}C dry) cable rated 600 volts.

2.3 SIGNAL CABLE

A. Type PLCC (Power Limited Control Cable):

1. General: Rated 300 volts, 90 deg. C, single pair (Pr.), triad (Tri.) or quad (Qd.).

2. Single Pr., Tri. Or Qd.: No. 16 AWG, stranded copper conductors, twisted and covered with a 100% aluminum-mylar shield, with drain wire and overall PVC jacket.

3. Multiple Pr., Tri. Or Qd.: Same as single construction except No. 20 AWG conductors and an overall aluminum-mylar shield in addition to individual shields.

4. Direct Burial Cable: Same as single or multiple constructions with addition of aluminum sheath and weatherproof outer jacket.

2.4 CONNECTORS AND TERMINALS

A. Insulated Crimp Type Connectors and Terminals: Nylon insulated, Burndy "INSULINK" and "INSULUG," or Thomas & Betts "Sta-Kon."

B. Split Bolts: High-conductivity copper alloy, Burndy "SERVIT" or Thomas & Betts "Split-Bolt."

C. Compression Terminals: Copper long barrel, Burndy "HYLUG" or Thomas & Betts "Color-Keyed," or aluminum alloy Buchanan "Cytolok CL500" series.

D. Bolted Terminals: Cast copper alloy, Burndy "QIKLUG" or Thomas & Betts "Locktite."

2.5 MISCELLANEOUS COMPONENTS

A. Tape:

1. Vinyl Plastic: 3M "Scotch 33+" or "Scotch 88."

2. Varnished Cambric (VC): 3M "Irvington 2920."

3. Friction: Black friction tape.

4. Color Coding: 3M "Scotch 35."

5. Fireproofing: 3M "Scotch 77."

6. High Temperature Glass Cloth: 3M "Scotch 69" (180ºC).

7. Electrical Insulation Putty: 3M "Scotchfil."

B. Splice Kits: 3M "Scotchcast 82 Series".

C. Pulling Lubricants: Ideal "Yellow 77" or Polywater "Type J."

D. Wire Markers:

1. Individual Wires: Write-on type with self-laminating vinyl overwrap, 3M "ScotchCode," Ideal "Write-On," or Thomas & Betts "WSL."

2. Multi-Conductor Cables or Groups of Wires as a Cable: Nylon tie on marker, Thomas & Betts "Nylon I.D. Ties Ty-Raps."

E. Wire and Cable Ties: Thomas & Betts "Ty-Raps."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Wire and Cable:

1. General:

a. Limit pulling tension to maximum values recommended by manufacturer.

b. Do not pull through boxes, fittings, or enclosures where a change of raceway alignment or direction occurs. Use of shieves is acceptable.

c. Do not cut strands from conductors to fit lugs or terminals.

d. Do not splice control or signal wiring.

B. Compression Connectors and Terminals: Install on wire and cable with approved tool and die to recommended compression pressure.

C. Bolted Connectors and Terminals:

1. Torque to manufacturer's recommended foot-pounds for size and class of connector.
2. Where manufacturer's published torquing requirements are not indicated, tighten connectors and terminals to comply with UL 486A torque values.
3. Use plated bolts and lock washers on terminal connections.

D. Wiring in Enclosures:

1. Form and tie conductors in panelboards, cabinets, control panels, motor controllers, wireways, and wiring troughs in a neat and orderly manner.

2. Use Thomas & Betts wire and cable ties of appropriate size and type.

3. Limit spacing between ties to not more than 6 inches.

E. Taping:

1. Above Ground and Dry Locations: Fill voids and irregularities with half-lapped layers of VC (two minimum) or electrical insulation putty. Insulate with three half-lapped layers of vinyl plastic and one half-lapped layer of friction tape.

2. Below Ground and Wet Locations: In lieu of taping protect connection with resin splicing kit.

3. Fireproofing: Same as specified for above ground and dry locations plus one half-lapped layer of fireproofing.

F. System Separation:

1. Control and Signal Wiring: Provide separate raceways or barriers in raceways to separate each of the following systems from other wiring:

a. 120 volt control wiring.

b. Analog 4-20 Milliamp.

c. Digital (Pulse).

3.2 APPLICATION

A. Wire and Cable:

1. THWN-THHN or XHHW for power wiring through No. 2 AWG, and control wiring in conduit. XHHW for sizes above No. 2 AWG in conduit.

2. Bare copper for ground conductors, which penetrate finished floor or grade and ground loops.

3. No. 12 AWG minimum for power circuits and No. 14 AWG minimum for control circuits unless noted otherwise on Drawings.

B. Connectors and Terminals:

1. Motor Terminations (Single Conductor Circuits): Insulated ring tongue crimp type connectors or compression terminals, connected back-to-back with plated bolt, nut and lockwasher, and then taped. Where strap screw devices are present use split tongue connectors in lieu of ring tongue connectors.

2. Motor Terminations (Parallel Conductor Circuits): Gang compression terminals on a 1/4-inch-thick copper bar.

3. Transformer Terminations: Split bolt connectors for pigtail connections. Compression terminals for all other connections.

C. Multiconductor Control Cable: 14 AWG conductors except 16 AWG may be used in control enclosures.

3.3 COLOR CODING

A. Power Wiring: Provide color coding for single and multi-conductor power circuits as follows:

Voltage	ØA	ØB	ØC	Neutral
240 volts and below	Black	Red	Blue	White
250 - 600 volts	Brown	Orange	Yellow	Natural Gray

1. For specified insulations and jackets not manufactured with integral colors, use conductors with black insulation or jacket and color coding tape.

2. Color code conductors entering boxes, troughs, cabinets, and other enclosures.

3. Color code conductors in wireways, trenches, and other locations where conductors are continuously accessible at intervals not exceeding 5 feet.

B. Insulated Equipment Ground: Green.

C. Control Cables:

1. Single Conductors: Red (AC), Blue (DC).

2. Multi-conductor: Comply with ICEA S-66-524, "Method 1", Table K-2.

D. Signal Cables: Comply with ICEA S-82-552, "Method 9", Table E-2. In addition, number multiple pairs, triads, and quads.

3.4 IDENTIFICATION

A. Cables: Attach nylon tie on markers on both ends of cable denoting cable type and number as noted on Drawings. Where a number of 1/C wires are identified as a single cable, group conductors using "Ty-Raps" and attach markers.

B. Conductor Identification: Attach conductor markers on both ends of wire and label as indicated on Drawings.

END OF SECTION

SECTION 16130

BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section specifies electrical outlet, device, pull, junction boxes and wireways and installation.

1.2 DEFINITIONS

A. Outlet Box: A box used as a wiring enclosure that may be used as a device box with the addition of a plaster ring or special cover.

B. Device Box: A box designed to house a switch, receptacle or other wiring devices.

1.3 QUALITY ASSURANCE

A. Furnish boxes bearing label or listing of a Nationally Recognized Testing Laboratory (NRTL), as defined in OSHA Regulation 1910.7.

PART 2 - PRODUCTS

2.1 OUTLET AND DEVICE BOXES

A. General:

1. UL 514A and 514B for all boxes.

2. NEMA OS 1 for sheet steel boxes.

B. Cast Iron Boxes: Crouse-Hinds or Appleton "FS/FD" and "ALC" series.

C. Cast Aluminum Boxes: Crouse-Hinds “FS-SA”/”FD-SA” or Appleton “FS-A”/”FD-A” Series.

D. Sheet Steel Boxes: Pressed steel, galvanized, 4 inch octagonal or 4 inch square (or "gang") boxes, depth as needed to accommodate devices and associated wiring.

E. Accessories: Provide fixture studs, plaster rings, extension rings, and covers as required for application. Galvanized steel indoors and galvanized cast ferrous metal or cast aluminum with neoprene gaskets outdoors.

F. Floor Boxes;

1. Acceptable Products:

	Hubbell	Steel City
Single-gang box	B-2436	641
Two-gang box	B-4233	642

Three-gang box	B-4333	643
Duplex receptacle trim	S3625	P-64-DU
Telephone/Signal trim	S2425	P-64-3/4-2

2. Accessories: Provide necessary floor covering adapters, plugs, gaskets, nipples and sealing compound.

2.2 JUNCTION AND PULL BOXES

A. Boxes (6 Inch Minimum Dimension):

1. Welded galvanized sheet steel, of sizes required by NEC, without knockouts.

2. 14 gauge metal for boxes with maximum dimension of less than 24 inches, 12 gauge for boxes with maximum dimension of 24 to 35 inches, and 10 gauge for boxes with any dimension greater than 35 inches.

3. Provide removable, flame retardant, insulating cable supports in boxes with any dimension greater than 42 inches.

4. Comply with UL 50 for boxes over 100 cubic inches volume.

5. Provide screwed or bolted covers of same gauge as box.

B. Boxes (4-11/16 Inch Maximum Dimension): Pressed steel, galvanized, 4 or 4-11/16 inches square, 1-1/2 or 2-1/8 inches deep.

C. Weatherproof Boxes: NEMA 3R, continuously welded-seam, galvanized sheet steel enclosures with gasketed covers.

D. Watertight Boxes: Galvanized cast iron with gasketed, bolt-on covers, tapped holes in bosses or hubs for conduit entrances, and integrally cast mounting lugs.

2.3 WIREWAYS

A. Provide hinged cover NEMA 1 lay-in steel wireway assemblies of sizes indicated on Drawings.

B. Provide special lengths, telescope fittings, box connectors, elbows and other fittings as required for a complete system.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Mount boxes plumb and level and rigidly attach them to the structure.

2. Clean interiors before installing trim and cover.

3. Close unused openings with blanking devices or threaded plugs.

4. Install surface mounted units at least 1 inch off of walls with supports placed in such a manner to permit vertical flow of air behind the enclosure.

B. Wireways:

1. Assemble and erect system so that access covers are on top of horizontal runs

2. Do not mount wireways directly to building structure or machinery. Use a trapeze assembly to install wireways.

3.2 APPLICATION

A. NEMA 3R for outdoor installations.

B. NEMA 1 for all other areas unless indicated otherwise on the Drawings.

C. Cast iron "FS/FD" for use with surface mounted steel conduit unless noted otherwise on the Drawings or in other Specification Sections.

D. One-piece stamped steel boxes for installation in partitions, walls, and suspended ceilings.

E. Tile box, 3-½ inch deep for installation in poured concrete walls and concrete columns. 4-inch octagonal box with removable back cover for installation in overhead concrete slabs.

END OF SECTION

SECTION 16190

SUPPORTS AND FASTENERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Supports and hangers, anchors, and fastenings for mounting and anchoring electrical raceways, equipment, and fixtures.

B. Related Sections: Additional support requirements for specific items are specified elsewhere in Division 16.

PART 2 - PRODUCTS

2.1 FIELD FABRICATED SUPPORTS

A. Structural steel shapes and plates as specified in Division 05000. Hot-dipped galvanized for outdoor locations.

B. 3/8 inch minimum, continuous thread, plated or galvanized hanger rod.

C. Prefabricated structural systems manufactured by American Electric Kindorf, Power-Strut, or Unistrut.

2.2 CONDUIT SUPPORTS

A. Clamps: Steel City or American Electric Kindorf "RC" and "PC" clamps.

B. Straps:

1. Conduit Straps: Plated steel or hot-dipped galvanized, "two-hole" straps.

2. Channel Straps: American Electric Kindorf "C-105," Power-Strut "PS-1300," or Unistrut "P1100" and "P1400."

C. Hangers:

1. Conduit Hangers: Steel City Series "6H" or Erico Products, Inc. Caddy "CD" series.

2. Lay-In Pipe Hangers: American Electric Kindorf "C-149," Power-Strut "PS-3200," or Unistrut "J1200."

D. Clips: Erico Products, Inc. "Caddy M" Series snap-lock conduit clip in combination with a "Caddy Universal" drive-on beam clamp or threaded rod.

2.3 ANCHORS

A. Toggle Bolts: Star "3000" series.

B. Plastic Anchors: Star "06" series with appropriately sized metal screws.

C. Lead Shields and Lag Bolts: ITW Ramset/Red Head "LS" series or Star "1800" series.

D. Hollow Wall Anchors: ITW Ramset/Red Head "WA" series or Star "2700" series.

E. Threaded Expansion Anchors: ITW Ramset/Red Head "J," "S" or "JS" series, or Star "3400" series.

F. Wedge Anchors: ITW Ramset/Red Head "WS" series or Star "3500" series.

2.4 FASTENERS

A. Bolts and Nuts: ASTM Grade 2, low carbon, plated or galvanized, hex head.

B. Beam Clamps: American Electric Kindorf "E-160" or "E-231," Power-Strut "PS800" and "PS2000," or Unistrut "P2600" or "P2700" clamps with retainers.

C. Channel/Angle Clamps: American Electric Kindorf "E-177" or equal.

2.5 GALVANIZING REPAIR PAINT

A. ASTM A 780.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Fabricate and install supports so that supported installation does not weaken or overload structure.

2. Do not impose weight of electrical equipment, raceways, or fixtures on supports provided for non-electrical systems unless indicated otherwise on Drawings.

3. Secure steel supports to structure by bolting or welding.

4. Use retaining device when making connections with setscrew-type beam clamps or C-clamps.

5. Maximum diameter of drilled holes in beam flanges shall not exceed 15% of width of flange.

6. Drill holes to leave minimum of 1/2 inch of steel from edge of member to edge of hole.

7. Support loads from bottom chord member of trusses or steel joists only where diagonal members attach to bottom chord.

8. Do not support loads from metal roof or floor decking.

9. Do not weld to steel joist.

B. Outdoor Supports: Coat bolted and field welded supports with galvanizing repair paint.

3.2 APPLICATION

A. Supports for Single Conduits:

1. Conduit in Direct Contact with Steel Framing: "RC" and "PC" clamps.

2. EMT, 1 Inch and Smaller in Direct Contact with Steel Framing: Conduit clips.

3. Suspended Conduit 1-1/4 Inch and Below: Hanger rod and conduit hanger.

4. Suspended Conduit 1-1/2 Inch and Above: Hanger rod and lay-in pipe hanger.

5. On Walls: Steel "one-hole" straps.

B. Supports for Multiple Parallel Conduits:

1. In Direct Contact with Steel Framing: Attach prefabricated 1-1/2 inch wide channel, of sufficient depth to support the load, directly to framing and attach conduits to channel straps.

2. Suspended: Assemble a "trapeze" hanger using prefabricated 1-1/2 inch wide steel channel of sufficient depth to support load, and two or more hanger rods. Attach conduits to channel using channel straps.

C. Wall Anchors:

1. Hollow Masonry Units: Support light loads such as one and two-hole straps, and outlet boxes with plastic anchors and screws. Support heavy loads such as panelboards, safety switches, and multiple conduit runs with toggle bolts.

2. Solid Masonry Units: Lead shields and lag bolts; use through-bolts for tension loads.

3. Gypsum Board: Hollow wall anchors.

D. Concrete Floor and Overhead Slabs:

1. For overhead equipment loads less than 400 lbs., use at least two (2) 3/8-inch minimum diameter threaded expansion anchors. For equipment loads in excess of 400 lbs., but less than 1,000 lbs., use at least two (2) 3/8-inch minimum diameter wedge anchors.

END OF SECTION

SECTION 16195

IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Identification and information signs and warning signs for electrical equipment.

B. Related Sections: Additional identification requirements for specific items are specified elsewhere in Division 16. See Specification Section 16121 – Low Voltage Copper Wire and Cable for wire identification.

1.2 APPLICABLE STANDARDS

A. OSHA Subpart S.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Identification and Information Signs:

1. Rigid laminated phenolic, per owner specific color requirements (ie. red background for red systems).

2. Text size for equipment designations shall be as large as space allows, up to 1-1/2” maximum.

3. 1/2-inch minimum text size.

4. Contractor shall submit proposed lettering for approval by Owner.

5. The Contractor shall coordinate names, abbreviations, and other designations used in the electrical identification work with the corresponding designations shown, specified and scheduled. Provide numbers, lettering, and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of the electrical systems and equipment.

B. Warning Signs:

1. OSHA Subpart J - General Environmental Controls, Section 1910.145.

2. Signs provided with equipment are acceptable provided all necessary signs are issued with equipment.

3. Provide identical signs for each application.

4. High voltage warning signs to read "DANGER - HIGH VOLTAGE - KEEP OUT."

C. Panelboard Directories:

1. Provide typewritten directory of cardstock and secure in panelboard transparent plastic pocket on interior of panelboard door.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Identification and Information Signs:

1. Location: Place signs on the following equipment:

a. Panelboards

b. Control Panels

c. Junction Boxes

2. Minimum Information on Sign: Include the following information:

a. Equipment Designation.

b. Operating Voltage.

c. Served From equipment designation.

d. For branch circuit panelboards, include color coding for phase, neutral, and ground conductors for each voltage system used in accordance with NEC paragraph 210-5(c).

B. Panelboard Directories. Provide fully completed typewritten circuit directory cards. Identify each circuit using descriptions contained in panelboard schedules on Drawings.

C. Mounting: Mount signs to clean, dry equipment surface with an epoxy adhesive.

END OF SECTION

SECTION 16200

LIGHTING SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. Furnish and install all lighting fixtures as shown and scheduled.

B. The Contractor shall furnish and install lighting fixtures complete with lamps for every lighting outlet scheduled on the accompanying drawings. Where a fixture type designation may have been omitted from the plans, it shall be the responsibility of the electrical bidder to contact the Owner's Representative prior to the bid opening and determine which fixture type is intended at the location in question. No allowance will be made on behalf of the Contractor who fails to comply with this requirement.

1.2 SUBMITTALS

A. Comply with the provisions and requirements of Section 01330, Submittal Procedures.

B. Submit product data in accordance with Section 16010 for all fixtures scheduled on the plans, all lamps, ballasts and all associated mounting equipment related to this project. For all lighting system Submittals, include the manufacturer's name, catalog number, ballast type, type and size of lamp and all ordering data.

1.3 RELATED WORK

A. The requirements of Section 16010, General Requirements for Electrical Work, and other sections govern the work specified in this section, where applicable.

1.4 SECTION INCLUDES

A. Fixtures

B. Ballasts

C. Lamps

D. Photocells

PART 2 – PRODUCTS

2.1 FIXTURES

A. All lighting fixtures shall be furnished complete with mounting accessories to suit the specific service intended. See architectural and structural plans for ceiling and construction details where fixtures are to be mounted. Coordinate final location with architectural and mechanical features.

B. Fixtures shown in the schedule to be recessed shall be complete with any accessories required to fit the fixture to the ceiling construction. See architectural plans for type of ceilings. Locate fixtures in regard to ceiling patterns, unless otherwise indicated on drawings.

C. Fixtures scheduled to be surface mounted shall be furnished and installed employing supports, toggle bolts and any other accessories which, in the opinion of the Owner's Representative, are required to adequately support the fixtures.

2.2 LED DRIVERS

A. Driver shall be available in a plastic/metal can or all metal can construction to meet all plenum requirements.

B. Driver shall be provided with poke-in wire trap connectors or integral leads color coded per ANSI C82.11.

C. Driver shall operate from 60Hz input source of 120V with sustained variations of +/- 10% (voltage and frequency) with no damage to the driver.

D. Driver output shall be regulated to +/- 5% across published load range.

E. Driver shall operate LEDs at a frequency of 60Hz.

F. Driver shall have a power factor greater than 0.90 for primary application.

G. Driver input current shall have Total Harmonic Distortion (THD) of less than 20%.

H. Driver shall have a Class A sound rating.

I. Driver shall have a minimum operating temperature of -40deg C.

J. Driver shall tolerate sustained open circuit and short circuit output conditions without damage and without need for external fuses or trip devices.

K. Driver shall not contain any Polychlorinated Biphenyl (PCB).

L. Driver shall be Underwriters Laboratories (UL) listed, Class 2 outdoor.

M. Driver shall comply with ANSI C62.41 Category A for Transient protection.

N. Driver shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 15, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

O. Driver shall be manufactured in a factory certified to ISO 9001 Quality System Standards.

P. Driver shall carry a 5-year limited warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 90deg C.

Q. Manufacturer shall have a 10-year history of producing drivers for the North American market, as a minimum.

R. Approved manufacturers shall be Phillips Advance or approved equal.

2.3 LAMPS

A. LED lamps shall be energy efficient, cool white light, a minimum of delivered lumens as noted on the drawings. 6000°K nominal colour temperature, Colour Rendering Index of 75 minimum, 120V operable.

2.4 PHOTOCELLS

A. Minimum 2,000 watts, 15 amperes at 120 volts, Paragon model PN-201 or 1,800 watts Paragon model CW201, or approved equivalent. Die-cast aluminum housing for 3/4-inch conduit threaded hub nipple, and directional lens. Photocell shall be mounted on roof facing north.

B. For 208- or 277-volt circuits, use locking type control, 1,800 watts. Provide Paragon Model PN-201-71 or CW-201-71 (or approved equivalent), respectively.

C. All photocells shall fail in the 'ON' position.

PART 3 - EXECUTION

3.1 CLEANING

A. All fixtures shall be cleaned and left free of any dirt, dust, grease, etc., at the completion of the job.

3.2 ORDERING

A. Contractor shall not order any fixtures until submittals are approved.

3.3 COORDINATION

A. Contractor shall coordinate with other crafts for final location and openings for all fixtures.

3.4 FIXTURES

A. All exterior lighting fixtures shall be furnished complete with gaskets, cast aluminum weatherproof outlet boxes, labeled approved for damp locations and be solidly grounded.

3.5 SUPPORT

A. All fixtures shall be securely supported from the building structure. All lighting fixture installations shall comply with NEC Article 410.

END OF SECTION

SECTION 16450

GROUNDING

PART I - GENERAL

1.1 SECTION INCLUDES

A. Section specifies grounding of electrical systems and equipment and grounding of conductive machine frames, enclosures, appliances, structures and other equipment for protection of life, equipment, circuits, and systems.

1.2 QUALITY ASSURANCE

A. Refer to Section 16010, Electrical System General Requirements for Codes and Standards.

B. In addition to the Codes and Standards summarized in Section 16010, Grounding shall comply with the requirements of IEEE 142, NFPA 70 Article 250 and UL 467.

C. UL Labeling or Listing: Furnish grounding fittings bearing label of or listing by UL.

D. NRTL Labeling or Listing: Furnish grounding fittings bearing label of or listing by a Nationally Recognized Testing Laboratory (NRTL) as defined in OSHA Regulation 1910.7.

1.3 SUBMITTALS

A. Test Reports: Submit to Engineer two copies of grounding system test report certified by testing technician and Owner's representative, in accordance with section 01810, Commissioning.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Conductors: Copper, refer to Section 16121.

B. Exothermic Welding: Molds and charges by Erico Products, Inc. "Cadweld" or Continental Industries, Inc. "Thermoweld".

C. Ground Rods: (5/8)-inch diameter, 10 feet long, copperclad sectional ground rods.

D. Grounding Clamps: O-Z/Gedney or Steel City "G" series.

E. Connectors, Terminals, and Tape: Refer to Section 16121.

F. Flexible Conduit Connectors: Refer to Section 16111.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install grounding system comprised of the following major components:

1. Steel reinforcing bars in column footings with Eufer ground bonded together as grounding electrodes to provide connection to earth.

2. Ground loop.

3. Driven rod at service entrances.

4. Continuous equipment grounding conductors in electrical raceways and cable runs to ensure a positive path for connection of equipment that must be grounded.

5. Water pipe electrode.

6. Continuous bond of all items listed above.Connection of Equipment to Framing

C. Steel:

1. General: Connect below grade and concealed conductors using exothermic welds. Connect above grade using mechanical connectors.

2. Distribution Equipment: Connect ground bus in switchgear assemblies, motor control centers, motor control panelboards, and power panelboards to the grounding system using a conductor sized in accordance with NEC Table 250.122 but no smaller than No. 2 AWG.

D. Equipment Grounding:

1. Provide electrically continuous equipment grounding conductors sized per NEC Table 250.122, or as indicated on Drawings, in electrical raceways containing conductors rated higher than 30 volts.

2. Bond grounding conductors to grounding bushings, grounding locknuts, grounding lugs, equipment, fixtures, enclosures and transformer neutrals.

E. Flexible Metal Conduit: Provide an external grounding jumper on flexible conduit runs longer than 6 feet.

1. Spiral wrap the grounding conductor through a minimum of 360^{o} around outside of flexible conduit.

2. Terminate jumper and flex on each end with an insulated grounding fitting.

3. Size jumper same as equipment grounding conductor in the flexible conduit but no smaller than No. 6 AWG.

F. Expansion Joints: Provide No. 4/0 AWG jumper with 6 inches of sag across structure expansion joints.

1. Bond jumpers to framing steel on both sides of the joint using exothermic welds.

2. Provide a jumper every 50'-0" maximum along expansion joint with a minimum of two jumpers per expansion joint.

3.2 FIELD QUALITY CONTROL

A. Tests: After complete installation of grounding system, measure ground resistance using the three terminal "Fall-of-Potential" method.

1. Comply with IEEE 81.

2. Space electrodes so that the potential electrode is located from the reference starting point a distance equal to 62% of the sum of the distances from the reference starting point of the test object and the current electrode.

B. Testing Firm: Employ an independent testing firm using NETA certified testing technicians.

C. Test Values: Maximum resistance value of the ground electrode system is not to exceed 5 ohms. If test results exceed 5 ohms, proceed as directed by the Engineer.

END OF SECTION

SECTION 16475

MOLDED CASE CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section specifies molded case circuit breakers in individual enclosures, panelboards, combination motor starters, and control panels.

1.2 RELATED SECTIONS

A. Section 01330 Submittal Procedures

B. Section 16010 Electrical System General Requirements

C. Section 16030 Equipment Installation

1.3 QUALITY ASSURANCE

A. Refer to Section 16010, Electrical System General Requirements for Codes and Standards.

B. In addition to the Codes and Standards summarized in Section 16010, molded case circuit breakers shall comply with the requirements of:

1. NEMA AB 1.

2. UL 489.

C. UL Labeling or Listing: Furnish circuit breakers bearing UL label.

D. NRTL Labeling or Listing: Furnish circuit breakers bearing label of a Nationally Recognized Testing Laboratory (NRTL) as defined in OSHA Regulation 1910.7.

1.4 SUBMITTALS

A. Submit Product Data on each circuit breaker showing ratings, overall dimensions, enclosure type, and accessories in accordance with Section(s) 01330, Submittal Procedures.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. General:

1. Voltage rating for the point of application, frame size, trip rating, and interrupting rating are noted on Drawings.

2. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism. Automatic tripping of the breaker shall be clearly indicated by handle position. Contacts shall be non-welding silver alloy and arc extinction shall be accomplished by means of arc chutes.

3. All breakers shall be “bolt on” type.

4. When used for switching lighting circuits, breakers shall be marked “SWD” (Switch Duty Rated).

5. All multi-pole breakers shall have common trip. Wires, pins, etc., between single pole breakers to form common trip will not be acceptable.

6. The use of “Pushmatic” or miniature “Quicklag” breakers shall not be permitted.

7. Provide individually enclosed and panelboard mounted circuit breakers of the thermal-magnetic type with inverse time and instantaneous trip characteristics rated for operation in a 40^{o}C ambient.

8. Provide breakers used in combination with motor starters with adjustable instantaneous trips.

9. Provide shunt trip devices, motor operators, interlocks, auxiliary contacts, bell alarm switches, and other modifications as noted on Drawings or specified in Section 16481.

10. Do not use “trunk type” latches on enclosures.

B. Enclosures:

1. NEMA 1 for dry, indoor areas. NEMA 3R for damp or outdoor locations.

2. Other ratings as noted.

C. Acceptable Manufacturers include: General Electric Company, Square D Company and Siemens.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Mounting: Refer to Section 16190. Mount individually enclosed circuit breakers with top of enclosure 6'-6" above finished floor unless indicated otherwise on Drawings.

B. Trip Settings: Set adjustable instantaneous trips to minimum, unless indicated otherwise on Drawings.

C. On magnetic breakers in combination with starters, set trips at the lowest value that will permit motor starting, but not higher than 13 times the motor nameplate full-load current.

3.2 IDENTIFICATION

A. Refer to Section 16195.

END OF SECTION