

CONDITIONS, SPECIFICATIONS AND RELATED DOCUMENTS FOR

JACKSON OWRE MILLARD LYON COMPLEX REMODELING  
CONTRACT A (JOML-A)  
MINNEAPOLIS CAMPUS  
UNIVERSITY OF MINNESOTA  
COMMISSION NUMBER 280.01  
PROJECT NUMBER MINN. BHRD-HP-5C-070

James F. Brinkerhoff  
Vice President for Finance and Development                      University of Minnesota

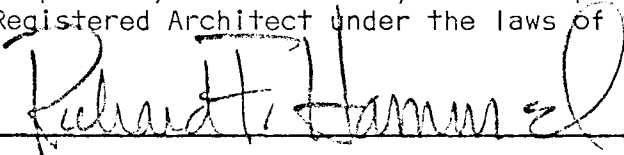
Clinton N. Hewitt  
Assistant Vice President for Physical Planning                      University of Minnesota

THE ARCHITECTS COLLABORATIVE, INC.                      Cambridge, Massachusetts

HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.  
University Park Plaza - Suite 704  
2829 University Avenue South East                      Minneapolis, Minnesota  
(612) 378-3833                      55414

The Cerny Associates, Inc.                      Minneapolis, Minnesota  
Hammel Green and Abrahamson, Inc.                      Saint Paul, Minnesota  
Setter, Leach and Lindstrom, Inc.                      Minneapolis, Minnesota

I hereby certify that these plans, specifications or reports were prepared by me or under my direct supervision, and that I am a duly Registered Architect under the laws of the State of Minnesota.

  
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Date: July 20, 1976

Reg. No. 3667

ALL CONTRACTS

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ADVERTISEMENT FOR BIDS

JACKSON OWRE MILLARD LYON COMPLEX REMODELING

CONTRACT A (JOML-A)

UNIVERSITY OF MINNESOTA - MINNEAPOLIS CAMPUS

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BIDS CLOSE: 2:00 P.M. CDT, Wednesday, August 18, 1976  
BIDS RECEIVED AT: ST. PAUL, MINNESOTA

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CONTRACT A (JOML-A)  
COMMISSION NUMBER 280.01  
DOCUMENTS DATED: July 20, 1976

THE ARCHITECTS COLLABORATIVE, INC., AND  
HEALTH SCIENCES ARCHITECTS AND ENGINEERS, INC  
UNIVERSITY PARK PLAZA - SUITE 704  
2829 UNIVERSITY AVENUE S.E.  
MINNEAPOLIS, MINNESOTA 55414

Sealed lump sum Bids will be received on behalf of the University of Minnesota Board of Regents, at the office of Robert James, Director of Purchasing and Stores, in the Administrative Services Building, 2610 University Avenue, St. Paul, Minnesota 55114 until 2:00 P.M. CDT, Wednesday August 18, 1976. Bids received after this time will not be accepted nor opened. Immediately after closing time, Bids will be opened publicly and read aloud.

The Project consists of furnishing all labor, material, equipment and incidentals for construction of building additions and alterations at Millard Hall and Jackson-Owre Hall on the Minneapolis Campus of the University of Minnesota. This project is a part of the Jackson Owre Millard Lyon Complex Remodeling.

Bids will be received for a single lump sum contract for all work required by Contract Documents.

No bidder may withdraw his bid until 45 days after the date of opening of Bids.

Bidding requirements, bid and contract forms, drawings and specifications may be examined at:

Office of the Architect/Engineer, listed above.

Office of the Engineering and Construction Division, Folwell Hall,  
University of Minnesota, Minneapolis, Minnesota.

The Builders Exchanges of Minneapolis and Saint Paul, Minnesota

F. W. Dodge Corporation Plan Room, Minneapolis, Minnesota.

One complete set of the documents for this Work may be obtained from the office of Health, Sciences Architects and Engineers, Suite 704 University Park Plaza, 2829 University Avenue, S. E., Minneapolis, Minnesota, 55414, in accordance with the Instructions to Bidders, upon making a deposit in the form of a check in the amount of \$50.00 payable to Health Sciences Architects and Engineers, Inc. Sets requested to be mailed will be forwarded C.O.D.



The full deposit will be returned to bidders who submit a bona fide prime contract bid to the University, upon the return of the complete set of documents in good condition to the Health Sciences Architects and Engineers, Suite 704 University Park Plaza, 2829 University Avenue S.E., Minneapolis, Minnesota 55414, within 10 days after bid date. Deposits will be returned to others in accordance with the Instructions to Bidders, upon return of the complete set of documents under the same time and conditions.

A bid security in the amount of five percent (5%) of the maximum amount of the Bid, shall be submitted with each Bid in such form and subject to the conditions stated in the Instructions to Bidders.

The attention of all bidders is called to the Equal Employment Opportunity requirements for contractors, subcontractors and suppliers, as stated in the Contract Documents.

The University reserves the right to reject any and all bids, accept any bid it deems to be in its best interest, to waive any informalities in bids submitted and waive minor discrepancies in bidding procedures.

REGENTS OF THE UNIVERSITY OF MINNESOTA

By: Robert James

Director of Purchasing and Stores for the  
Regents of the University of Minnesota

## INSTRUCTIONS TO BIDDERS

### ARTICLE 1 - INVITATION FOR BIDS

#### 1.1 Invitation

1.1.1 The Regents of the University of Minnesota, referred to as the University, invite qualified bidders to submit lump sum bids for the Project identified as:

JACKSON OWRE MILLARD LYON COMPLEX REMODELING  
CONTRACT A (JOML-A)  
MINNEAPOLIS CAMPUS  
UNIVERSITY OF MINNESOTA

as prepared by:

THE ARCHITECTS COLLABORATIVE, INC., CAMBRIDGE, MASS.  
and  
HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.  
University Park Plaza - Suite 704  
2829 University Avenue S.E.  
Minneapolis, Minnesota 55414

#### 1.2 Types of Bids

1.2.1 Bids will be received for a single lump sum Contract for the entire construction described in the Contract Documents for this Contract A.

### ARTICLE 2 - BIDDING PROCEDURES

#### 2.1 Bid Time and Place

2.1.1 Bids shall be submitted to the designated location indicated in the Advertisement for Bids, by the designated time or any extension thereof made by Addendum. Bids received after the time and date for receipt of bids will not be opened.

2.1.2 Bidder shall assume full responsibility for timely delivery at location designated for receipt of bids.

#### 2.2 Preparation of Bid

2.2.1 One copy of the bid shall be submitted in the form included in the specification. Forms are available from the Architect/Engineer.

2.2.2 All blank spaces on the Bid Form shall be filled in by typewriter or manually in ink, expressing the sums both in words and figures. In all cases the written and numerical figures must agree, otherwise it may be cause for rejection of the Bid.

2.2.3 Any interlineation, alteration or erasure must be initialed by the signer of the Bid.

2.2.5 In the event unit prices are called for, a Bid for each unit price shall be submitted.

2.2.6 The Bidder shall not make any additional stipulations or alternates, nor qualify his Bid in any other manner.

2.2.7 Bidder shall state all addenda received or considered in preparing his Bid.

2.2.8 Each copy of the Bid shall include the legal name of Bidder and a statement whether Bidder is a sole proprietor, a partnership, a corporation, or any other legal entity, and each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. If the Bidder is a partnership, the names of all partners shall be stated. A Bid by a corporation shall further give the State of incorporation and have the corporate seal affixed.

2.2.9 The signature on the Bid shall be in longhand, in ink.

### 2.3 Submission of Bids

2.3.1 The Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope.

2.3.2 The envelope shall be addressed to the party receiving the bids and shall be identified with the Project name, the Bidder's name and address, and the portion of the project or category of work for which the Bid is submitted. If the Bid is sent by mail the sealed envelope shall be enclosed in a separate mailing envelope with the notation "BID ENCLOSED" on the face thereof.

### 2.4 Modification or Withdrawal of Bid

2.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of bids, and Bidder so agrees in submitting his Bid.

2.4.2 Prior to the time and date designated for receipt of bids, bids submitted early may be modified only by notice to the party receiving bids at the place and prior to the time designated for receipt of bids.

.1 Such notice shall be in writing over the signature of the Bidder or be by telegram; if by telegram, written confirmation over the signature of the Bidder must have been mailed and postmarked on or before the date and time set for receipt of Bids; it shall be so worded as not to reveal the amount of the original Bid. If the written confirmation is not received by the party receiving bids within 24 hours after bid closing time, no consideration will be given the telegraphic modification.

2.4.3 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these instructions to Bidders.

2.4.4 Bid security, shall be in an amount sufficient for the bid as modified or resubmitted.

### ARTICLE 3 - BID SECURITY

#### 3.1 Form of Security

3.1.1 The Bid shall be accompanied by a bid security in accordance with these requirements. The bid security shall pledge that the Bidder will enter into a contract with the University on the terms stated on his Bid, in accordance with the Contract Documents, and will furnish the required Performance Bond.

3.1.2 The bid security shall be in the form of a certified or cashier's check drawn on a solvent bank, or a bid bond, drawn to the order of the "Regents of the University of Minnesota".

3.1.3 Bid bonds shall be duly executed by the bidder as principal, issued by a corporate surety company authorized to do business in the State of Minnesota, with a current copy of Power of Attorney of the Attorney-in-Fact who executes the bond on behalf of the surety attached, as well as proper acknowledgements.

3.1.4 The amount of the bid security shall be as stated in the Advertisement for Bids, but in no event less than 5% of the maximum amount of the Bid, including additive alternates, if any.

#### 3.2 Retention of Bid Security

3.2.1 The University shall have the right to retain the bid security of all bidders until either (a) the Contract has been executed and bonds required, have been furnished or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all bids have been rejected. Thereafter, bid security in the form of checks will be returned to bidders and bid bonds returned upon request of the Bidder.

#### 3.3 Forfeiture of Bid Security

3.3.1 Should the Bidder be awarded a contract and fail or refuse to execute and deliver the Contract and performance bonds required within 10 days after he has received notice of the acceptance of his bid, he shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid. In the event the Contract has not been prepared for signature within 10 days after notice of award, the bidders shall have three days after it is prepared and offered to execute the Contract and provide the performance bond.

### ARTICLE 4 - CONSIDERATION OF BIDS

#### 4.1 Opening of Bids

4.1.1 Bids will be opened publicly and read aloud immediately after the time for receipt of bids.

#### 4.2 Informalities

4.2.1 The University reserves the right to consider informal any Bid not prepared in strict accordance with requirements herein and to waive said informalities and to waive minor discrepancies in bidding procedures.

#### 4.3 Rejection of Bids

4.3.1 The University shall have the right to reject any or all bids and in particular to reject a Bid not accompanied by any data required by the Bidding Documents or a Bid in any way incomplete or irregular.

#### 4.4 Acceptance of Bid (Award Procedures)

4.4.1 In consideration of alternates, it is the intent of the University, if it accepts any alternates, to accept them in the order in which they are listed on the Bid Form. However, the University reserves the right to accept alternates in any order if such acceptance out of order does not change the low Bidder.

4.4.2 The low Bidder will be determined on the basis of the sum of the Base Bid and any alternates accepted.

4.4.3 In evaluating alternates which affect more than one contract, the University reserves the right to consider the total value of the alternate under all contracts and accept such alternates of the Bidders the University may deem in its best interest. In some instances it may result in additive amounts to some contracts and deductive amounts to others.

4.4.4 The University reserves the right to reject unit prices of a low Bidder if the unit prices are significantly out of balance with other bids, indicating a hardship may be imposed on the University. In such instances, the University may negotiate reasonable unit prices prior to award of the Contract.

4.4.5 The University reserves the right to award a contract it deems in its best interest and consider all factors. Serviceability, maintenance costs, life cycle costs, energy conservation, interchangeability with other facilities, flexibility, uniformity of appearance and similar factors may be considered.

4.4.6 It is the intent of the University to award a contract to the lowest responsible Bidder, all factors considered, provided the Bid has been submitted in accordance with the requirements of the bidding requirements and Contract Documents, is judged to be reasonable, and does not exceed the funds available. However, the University shall not be obligated to award a contract in any event.

4.4.7 The University reserves the right to disqualify bids, before or after opening, upon evidence of collusion, intent to defraud or other illegal practices on the part of the Bidder.

#### 4.5 Execution of Contract

4.5.1 Upon award of a Contract, the successful Bidder shall execute the Agreement within 10 days after it is offered to him, and provide the required performance bond. In the event the Agreement is not prepared, ready for execution, within 10 days after award, the Contractor shall execute the Agreement within 3 days after its preparation.

#### ARTICLE 5 - DOCUMENTS FOR BIDDING

##### 5.1 Documents for Bidders for a Contract with the University

5.1.1 Prospective bidders may obtain one complete set of drawings, specifications and other Contract Documents from the Architect/Engineer by making a deposit in the form of a check in favor of the Architect/Engineer in the amount specified in the Advertisement for Bids.

5.1.2 Sets requested to be mailed to Bidders will be forwarded C.O.D.

##### 5.2 Documents for Subcontract Bidders, Suppliers, Manufacturers and Quantity Surveyors

5.2.1 One set of drawings, specifications and other Contract Documents may be obtained from the Architect/Engineer for the amount noted in Advertisement for Bids.

5.2.2 One half (1/2) the deposit for the set will be returned upon return of the documents in good condition within 10 days after bid date.

##### 5.3 Return of Documents

5.3.1 All documents remain the property of the Architect/Engineer and shall be returned to him promptly after bid date, except a Bidder receiving a Contract with the University may retain his set and his full deposit will be returned for the first full set and 1/2 deposit for the remaining sets.

##### 5.4 Complete Sets Used in Preparing Bids

5.4.1 Complete sets of drawings, specifications and other Contract Documents, shall be used in preparing bids. Neither the Owner nor the Architect assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

##### 5.5 Partial Sets

5.5.1 Copies of individual drawings and pages of specifications may be purchased from the Architect/Engineer at the cost of \$1.50 per drawing and \$0.25 per page. The cost of these sheets will not be refunded.

5.5.2 Individual sheets or pages issued shall be used at the risk of the Bidder or subcontract bidders and shall not relieve the user from examining the complete set of drawings, specifications or other Contract Documents.

## 5.6 Use of Documents for Bidding

5.6.1 The University and Architect/Engineer, in making copies of the drawings, specifications or other Contract Documents available on the above terms, do so only for the purpose of obtaining bids on the Project and do not confer a license or grant for any other purpose.

## ARTICLE 6 - INTERPRETATION OR CORRECTION OF DOCUMENTS

### 6.1 Notice and Request for Interpretations and Clarifications

6.1.1 Bidders shall promptly notify the Architect/Engineer of any alleged ambiguity, inconsistency or error they may discover upon examination of the Contract Documents, Bidding Requirements, the site or local conditions.

6.1.2 Bidders requiring clarification or interpretation of the Documents shall make his request to the Architect/Engineer.

6.1.3 All notices of alleged ambiguities, inconsistencies or errors and requests for clarification or interpretation shall be made in writing and forwarded so it is received by the Architect/Engineer at least seven (7) days prior to bid date, unless longer periods are specified elsewhere for certain conditions.

### 6.2 Response to Notices and Requests

6.2.1 Corrections, interpretations and clarifications involving or providing information which is not already a part of the Bidding Requirements or Contract Documents will be made only by written addenda and supplemental or revised drawings if required.

6.2.2 Corrections, interpretations and clarifications will not be made in any other manner than by addenda and unless they are included in addenda, bidders shall not rely on information provided or received in any other manner. Neither the Architect/Engineer nor the University will be responsible for, nor honor any claims resulting from, or alleged to be the result of, misunderstanding by the Bidder (and subsequently the Contractor) of any discussion of the Project conditions prior to receiving bids. Any verbal communications during the bidding period are subject to inclusion in addenda; otherwise, they shall not be binding on the University nor the Architect. Any item not clarified by addenda shall be subject to interpretation by the Architect or University in accordance with the provisions of the General Conditions of the Contract or other Contract Documents.

## ARTICLE 7 - ADDENDA

### 7.1 Issuing Addenda

7.1.1 The Architect/Engineer will issue all required addenda, in writing, which may include supplemental or revised drawings.

7.1.2 Addenda will be mailed or delivered to all prospective bidders for a contract directly with the University, who have been issued a complete set of Documents are on record at the Architect/Engineer's office as a bidder. Bidders shall furnish the proper address for mailing of addenda.

7.1.3 Addenda will also be issued to the locations noted in the Advertisement for Bids where Contract Documents are on file for examination.

7.1.4 It is the intent that written addenda will not be issued less than 3 days prior to bid date.

## 7.2 Incorporating and Acknowledging Addenda

7.2.1 All addenda issued, and the information included therein, shall become part of the Contract Documents and shall be incorporated in all bids submitted.

7.2.2 All bidders, including those submitting subcontract or supply bids, shall be responsible to ascertain the addenda that have been issued prior to bid date, examining all of the addenda and determining the effect of addenda provisions on their bids and their work. Failure of any bidder to receive any such addendum or interpretation shall not relieve him from any obligation to complete the Work in accordance with the Contract Documents if awarded a Contract.

7.2.3 All bidders shall state on the Bid Form the number of addenda received and incorporated in their Bid.

## ARTICLE 8 - CONTRACTOR'S BOND

### 8.1 Bond for Performance and Payment

8.1.1 A bond for faithful performance and completion of the Project and for payment for all just claims in connection with the Project is required. The cost of said bond shall be included in all bids to the University.

8.1.2 The bond shall be in the form of the University's Contractor's Bond, as bound into the Documents or available from the University, and shall meet all requirements specified in the General Conditions of the Contract, paragraph 7.5. The properly executed Contractor's Bond shall be provided to the University at the time of execution of the Agreement with the University, and shall be accompanied by a certified and effectively dated copy of the Power of Attorney for the Attorney-in-Fact.

## ARTICLE 9 - QUALIFICATIONS OF BIDDERS

### 9.1 Qualifications

9.1.1 The University reserves the right to consider the competency and responsibility of a Bidder in making an award, which may include, but not be limited to: (1) Proof of financial responsibility, (2) quality of similar work, (3) amount of experience with similar projects, (4) facilities, personnel and equipment, (5) reputation for performance, including service after Substantial Completion, (6) capability to complete the work on time, and (7) integrity of the Bidder.

9.1.2 The University reserves the right to make any investigations necessary to satisfy itself that the Bidder is properly qualified to execute the work of the Project under the Contract. The University may make such investigations



as it deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the University all such information and data for this purpose as the University may request. The University reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the University that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

## ARTICLE 10 - OBLIGATIONS OF BIDDER

### 10.1 Examination of Documents

10.1.1 Each bidder is obligated to thoroughly examine and study all Contract Documents, Bid and Contract Forms and Bidding Requirements, if necessary, to fully inform himself as to all conditions, requirements and other factors which will affect his Bid or execution of the work under the Contract Documents. By submitting a Bid, the Bidder represents that he has made such examinations and study, that he understands the requirements of the Contract Documents and Bidding Requirements, that he is familiar with the site, site conditions and local conditions, and that his Bid is made in conformance with all requirements.

10.1.3 In examining the drawings, specifications and other Contract Documents, the Bidder shall study and examine the entire set of Contract Documents, including those drawings and specifications primarily intended to portray the work which may be under another Contract with the University or for trades not normally in the employ of the Bidder, so as to be totally familiar with the scope of the entire Project and all factors which will affect the Bid or accomplishment of the work under the Contract Documents.

10.1.4 The Bidder is obligated to obtain clarifications and interpretations, as well as to notify the Architect/Engineer of alleged errors, ambiguities or inconsistencies in accordance with Article 6 of the Instructions to Bidders.

10.1.5 No allowance or extras will be granted the Bidder who is awarded a Contract as a result of misunderstanding of the extent or scope of the work as a result of his failure to study all documents and conditions and record his own findings, or for neglecting any specified instructions in the preparation of his Bid.

### 10.2 Labor

10.2.1 Each Bidder shall investigate and fully inform himself as to the availability, local labor and union conditions and cost of the employment of labor for the Project, both skilled and unskilled, and shall consider such matters in the preparation of the Bid.

### 10.3 Materials, Equipment and Systems

10.3.1 By submitting a Bid, the Bidder represents that his Bid is based on the materials, equipment, systems and other similar items in full compliance with requirements and descriptions in the Contract Documents, without exception.

#### 10.4 Sales Tax

10.4.1 Bidders shall include the cost of the Minnesota Excise and Use Tax, as applicable, in their Bids.

#### ARTICLE 11 - SUBCONTRACTORS

##### 11.1 Acceptance of Subcontractors

11.1.1 Bidders are advised that any person, firm or organization to whom an award of a subcontract is proposed under the Contract must be acceptable to the University and the Architect/Engineer as specified under Article 5 of the General Conditions of the Contract.

#### ARTICLE 12 - PROPOSED ALTERNATE MATERIALS AND EQUIPMENT

##### 12.1 Intent

12.1.1 The intent of this Article is to encourage and permit competition on qualified products by reputable and qualified contractors, subcontractors, suppliers and manufacturers, whose products, reputations and performance warrant acceptance for the conditions, intent of design and performance considerations required for this Project. For consideration of alternate products, the procedures, time requirements and other provisions of this Article must be complied with.

12.1.2 To avoid hardships resulting from non-acceptance of a proposed product that has been bid, and to provide the equitable condition for all bidders, subcontract bidders and suppliers by their having the same knowledge of which products, in the opinion of the Architect/Engineer, will be acceptable as meeting the Project requirements, the evaluation period for proposed products shall be prior to the bid date, instead of after receipt of bids.

12.1.3 The word "product" herein means any material, equipment, system, assembly, manufacturer, brand, trade name, element, item or similar description as applicable.

12.1.4 Wherever a product is named on the drawings or in the specifications the phrase "or acceptable equal in the opinion of the Architect/Engineer" shall be implied throughout the specification, whether specifically noted or not.

##### 12.2 Procedure

12.2.1 All requests for consideration of proposed alternate products in lieu of those specified shall be made in writing. Requests shall clearly define and describe the product for which acceptance is requested, and shall be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data, list of references, model numbers, or other information necessary to completely describe and evaluate the item.

12.2.2 All requests shall be submitted to the Architect/Engineer so it is received a minimum of 14 days prior to bid date and hour, unless a longer period of time is specified in technical sections. Requests received after this time will not be reviewed nor evaluated.

12.2.3 Products which the Architect/Engineer deem basically acceptable for bidding purposes will be included in addenda. Information on acceptance will be provided in no other manner.

12.2.4 Acceptance of a product for bidding purposes shall not relieve the Bidder from complying with all requirements of the Contract Documents, including the criteria established in the Contract Documents and these Instructions to Bidders.

### 12.3 Criteria

12.3.1 Any product or manufacturer used as basis of the specifications shall generally set the basic criteria. It shall be expressly understood that any other product or manufacturer listed in the specification, or any addenda, as an acceptable alternate, will be acceptable provided they fully comply with the requirements and match the basic and essential criteria of the product used for base specification, including the level of workmanship quality, as determined by the Architect/Engineer. For final acceptance for use in the work, the Architect/Engineer shall have right to accept or reject proposed deviations. Should a proposed product be unable to meet the necessary requirements, the product shall not be used.

12.3.2 The use of references to standards, manufacturers, brands and similar designations is intended to establish the measure of quality as to minimum standards of design, function, appearance, type, strength, durability, construction, efficiency, sound level, finish, availability, service and similar characteristics, which have been determined as requisite for this Project.

12.3.3 Proposed alternate products shall also: be available in the same range of colors, textures, dimensions, gauges, types, and finishes as the material or article specified; must equal the specified item in strength, durability, efficiency, serviceability, ease and cost of maintenance; must be compatible with the building design and not necessitate design modifications, nor impose additional work or require changes in the work of any Contractor, or any other Subcontractor, vendor, or materials supplier, nor result in any additional cost to the University. The supplier or manufacturer providing any acceptable product shall bear the cost of any required modifications to spaces, services, utilities and other features as the result of the use of his product, including but not limited to larger capacity mechanical or electrical service, devices or utilities resulting from acceptance of the product for bidding purposes, as well as to pipes, conduits, ducts, and controls for conveying, distributing, and controlling those services or utilities; as well as insulation, wrappings, coatings, or other integral features of the lines or items conveying those lines.

12.3.4 For any same or like product for this Project, only one brand, manufacturer, source or type shall be used, as approved by Architect/Engineer and the University.

### 12.4 Use of Products

12.4.1 Where two or more products are shown or specified, the Bidder (and Vendor) has his option of which to use, provided the product proposed will

meet all requirements of the specifications and the design criteria. The right is reserved by the Architect/Engineer to accept or reject proposed deviations in design, function, construction or similar differences that will affect design intent or quality.

12.4.2 For products specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturers, trade names or similar reference, the Bidder obligates himself to submit proposals and accept award of a Contract based upon the use of such products as specified or accepted in addenda.

## ARTICLE 13 - COMMENCEMENT AND COMPLETION OF THE WORK

### 13.1 Commencement of Work

13.1.1 By submitting a bid, and execution of the Agreement, the Bidder (and Vendor) agrees to commence work in accordance with the General Conditions of the Contract, or as otherwise specified in Division 1 of the specifications.

### 13.2 Completion of Work

13.2.1 By submitting a bid, and execution of the Agreement, the Bidder (and Contractor) agrees to complete the Project within the time specified, including any separate phases, elements or areas of the entire Project which may be specified, and that time for completion is an essential condition of the Contract.

13.2.2 By submitting a Bid, and execution of the Agreement, the Bidder (and Contractor) expressly agrees the time (or times for various phases) for completion is reasonable, considering all factors. The Bidder (and Contractor) further represent he has: analyzed the Project, including the equipment, materials and methods; considered his own capabilities and work load; determined availability of qualified mechanics and unskilled labor; considered the time of year for commencement of work; made a reasonable allowance for weather variations and other potential delays encountered in the construction process; the condition of the site; considered the constraints specified; evaluated the effects of other contractors who may be on the site; and has taken these and other relevant factors bearing on the progress of the work into account.

## ARTICLE 14 - LAWS AND REGULATIONS

### 14.1 Compliance with Laws and Regulations

14.1.1 Applicable laws, rules, regulations and ordinances of the Federal Government, the State of Minnesota and municipalities, or other authorities, with jurisdiction over the construction of the Project shall be complied with.

## ARTICLE 15 - WAGES

### 15.1 Minimum Wage Rates

15.1.1 The attention of bidders is drawn to the Regents' policy on minimum wages, as specified under Article 16 of the General Conditions of the Contract.

#### ARTICLE 16 - EQUAL EMPLOYMENT OPPORTUNITY

##### 16.1 University Policy on Equal Employment Opportunities and Affirmative Action

16.1.1 It is the policy of the Regents of the University of Minnesota to promote equal opportunity of employment without discrimination based on race, creed, color, sex, or national origin. Henceforth, the Regents will require that all Contractors with the University, including suppliers supplying goods or services to it, regardless of where located or the form of the contractual relationship, be equal opportunity employers, whose business is guided by the principle that there shall be no difference in the treatment of persons because of race, creed, color, sex, or national origin. The Regents will also require that the Contractor take affirmative action to ensure implementation of this policy, such action to include but not to be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship.

16.1.2 The attention of bidders is drawn to the Equal Employment Opportunity Requirements under Article 15 of the General Conditions of the Contract.

16.1.3 Monthly reports will be required of the Contractor from the start of the Project until completion.

##### 16.2 Affirmative Action Plan

16.2.1 The Affirmative Action Plan is required of successful Contractors only and shall follow the specified requirements and the guidelines required by the University's Affirmative Action Officer, the State of Minnesota's Equal Employment Opportunity Officer and interested Federal Agencies. If a bidder has a question or needs assistance they may contact the University's Office of Equal Opportunity, Room 419, Morrill Hall, on the Minneapolis Campus, 373-7969.

#### ARTICLE 17 - EXAMINATION OF EXISTING CONDITIONS

##### 17.1 Arrangements for Examination

17.1.1 Bidders may examine exterior areas and public spaces (ie: corridors and lobbies) in adjacent buildings at their convenience at any time from 8:30 A.M. to 4:30 P.M.

17.1.2 For all other interior areas of adjacent spaces, the Bidders shall make arrangements to examine the areas by appointment. Arrangements may be made to examine the areas each Monday and Wednesday, starting at 9:00 A.M. Arrangements shall be made with Mr. Paul Maupin at the University Health Sciences Planning Office, telephone 373-8590.

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BID FORM

TO THE: REGENTS OF THE  
UNIVERSITY OF MINNESOTA  
MINNEAPOLIS, MINNESOTA

PROPOSAL FOR: Complete Construction

PROJECT: JACKSON OWRE MILLARD LYON COMPLEX  
REMODELING-CONTRACT A

ATTENTION: ROBERT JAMES  
DIRECTOR OF PURCHASING AND STORES  
2610 UNIVERSITY AVENUE  
ST. PAUL, MINNESOTA 55114

LOCATION: MINNEAPOLIS, MINNESOTA

DATE: \_\_\_\_\_

- 
- (1) Bid of \_\_\_\_\_  
(Firm name - hereinafter referred to as the "Bidder")
- (2) The Bidder, in compliance with Advertisement for Bids, hereby submits the Bid for the CONSTRUCTION OF JACKSON OWRE MILLARD LYON COMPLEX REMODELING-CONTRACT A, MINNEAPOLIS CAMPUS, UNIVERSITY OF MINNESOTA.
- (3) The Bidder agrees to accomplish the Work in strict compliance with the drawings, specifications and Contract Documents, dated July 20, 1976, prepared by the Architects Collaborative, Inc., and Health Sciences Architects and Engineers, Inc., Commission Number 280.01.
- (4) The Bidder, having examined the drawings, specifications and related documents, and being familiar with all of the conditions of the proposed work, including the availability of materials and labor, hereby proposes to furnish all labor, materials, services, and supplies, and to accomplish the Work for which this Bid is submitted, in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this Bid is a part.
- (5) Addenda: The Bidder hereby acknowledges that Addendum instructions numbered \_\_\_\_\_ have been received and/or the requirements therein have been incorporated in this Bid.
- (6) Completion of Work: The Bidder hereby agrees to commence work under this Contract on or before the time stipulated in the written "Notice to Proceed" in accordance with the General Conditions, and to complete all Work under this Contract in accordance with the requirements of Specification Section 01200 and all other provisions of the Contract Documents.
- (7) In completing this Bid, the Bidder shall complete the Bid in both words and figures.
- (8) Base Bid: Bidder agrees to provide all work required by the Contract Documents for the lump sum of \_\_\_\_\_

\$ \_\_\_\_\_

- (10) Bid Security: The Bidder submits the attached Bid Security in the form of a Certified Check, Cashier's Check or Bid Bond, in accordance with the instructions to Bidders, drawn to the order of the Regents of the University of Minnesota. The Bidder acknowledges the Bid Security may be retained by the University as specified in the Instructions to Bidders and agrees if the Bidder defaults in executing the Contract within the time set forth, or in furnishing the Performance Bond as specified, the check will become the property of the University (or the Surety will pay the University in the amount of the bond) as liquidated damages for the delay and additional expense to the Owner caused thereby.
- (11) Holding of Bids: The Bidder agrees this Bid shall be good and may not be withdrawn for forty five (45) days after the scheduled time and date for receiving bids.
- (12) Acceptance of Bids: The Bidder understands the University reserves the right to accept any Bid it determines in its best interest, and to reject any and all Bids. Upon receipt of notice of award of a Contract (acceptance of this Bid) the Bidder will execute the Agreement, in the specified form, within 10 days thereafter and to deliver a Contractor's Performance Bond, in the stipulated form, in accordance with Article 8 of the Instructions to Bidders and Paragraph 7.5 of the General Conditions.
- (13) Informalities: It is understood by the Bidder the University reserves the right to waive informalities in bids received and minor discrepancies in bidding procedure.

(14)

Certification for Equal Opportunity  
and Affirmative Action:

(Must Be Signed By Bidder)

The bidder hereby certifies that all of the specified requirements for Equal Opportunity and Affirmative Action, General Conditions Article 15, will be fully complied with, as stated, for this project.

\_\_\_\_\_  
(Signed) , Title

- (15) Information about Bidder:  
 If a Corporation, Incorporated in the State of \_\_\_\_\_  
 Qualified to conduct business in the State of Minnesota? \_\_\_\_\_  
 If a Partnership, full names of all Partners are \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A310

## Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we

as Principal, hereinafter called the Principal, and

a corporation duly organized under the laws of the State of  
as Surety, hereinafter called the Surety, are held and firmly bound unto

as Obligee, hereinafter called the Obligee, in the sum of

Dollars (\$ \_\_\_\_\_ ),

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_

_____	}	_____ (Principal) _____ (Seal)
(Witness)		_____ (Title)
_____	}	_____ (Surety) _____ (Seal)
(Witness)		_____ (Title)



This Agreement, made this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_,

by and between

(hereinafter designated the Contractor), and the Regents of the University of Minnesota (hereinafter designated the Owner),

Witnesseth, that the Contractor in consideration of the agreements herein made by the Owner, agrees with the said Owner as follows:

ARTICLE I. The Contractor shall and will provide all the materials and perform all the work for the

as shown on the drawings and described in the specifications prepared by the Architect, which drawings and specifications are a part of this contract.

ARTICLE II. It is understood and agreed by and between the parties hereto that the work included in this contract is to be done under the direction of the Owner's authorized representatives.

It is further understood and agreed by the parties hereto that any and all drawings and specifications prepared for the purposes of this contract by the said Architect, are and remain the property of the Owner, and that all charges for the same and for the services of said Architect are to be paid by the said Owner.

ARTICLE III. No changes shall be made in the work except upon written order of the Owner through its authorized representatives; the amount to be paid by the Owner or allowed by the Contractor by virtue of such changes to be stated in said order.

ARTICLE IV. The Contractor shall provide sufficient, safe and proper facilities at all times for the inspection of the work by the authorized representatives of the Owner and shall, after receiving written notice to that effect, proceed to remove from the grounds or buildings all materials condemned by them, whether worked or unworked, and to take down all portions of the work which, by like written notice, condemn as unsound or improper, or as in any way failing to conform to the drawings and specifications, and shall make good all work damaged or destroyed thereby.

Refer to the General Conditions of the Contract, Paragraphs 3.5 and 14.2

~~ARTICLE V. / Should the Contractor at any time refuse or neglect to supply a sufficient number of skilled workmen, or sufficient material of proper quality, or fail in any respect to prosecute the work with promptness and diligence; or fail in the performance of any of the agreements herein contained such refusal, neglect or failure being certified by the authorized representatives of the Owner, they shall be at liberty, after written notice to the Contractor, to provide any such labor or material, and to deduct the cost thereof from any money then due or thereafter to become due to the Contractor under this contract; and if the authorized representatives of the Owner shall certify that such refusal, neglect or failure is sufficient ground for such action, they shall also be at liberty to terminate the employment of the Contractor for the said work and to enter upon the premises and take possession for the purpose of completing the work included under this contract, of all material, tools, and appliances thereon, and to employ any other person or persons to finish the work, and to provide the material therefore; and in case of such discontinuance of the employment of the Contractor, he shall not be entitled to receive any further payment under this contract until the said work shall be wholly finished, at which time, if the unpaid balance of the amount to be paid under this contract shall exceed the expense incurred by the Owner in finishing the work, such excess shall be paid by the Owner to the Contractor; but if such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner, as herein provided, either for furnishing material or for finishing the work and any damage incurred through such default, shall be audited and certified by the authorized representatives of the Owner, whose certificate thereof shall be conclusive upon the parties.~~

ARTICLE VI. The Contractor shall complete the several portions, and the whole of the work comprehended in this agreement by and at the time or times hereinafter stated, to-wit:

time being of the essence of this contract. Should said contractor fail or neglect to prosecute said work as herein provided, and complete the same within the time above stated, he shall pay the Owner (1) the actual damages sustained by the delay, or (2) the sum specified in the specifications, plans and addenda, for each day said work shall remain uncompleted after said date, that amount being mutually agreed upon as liquidated damages in lieu of actual damages for such delay.

SUBJECT TO THE CONDITIONS OF ARTICLE 8 of the General Conditions

ARTICLE VII. / Should the Contractor be delayed in the prosecution or completion of the work by the act, neglect or default of the Owner, or of any other Contractor employed by the Owner upon the work, or by any damage caused by fire or other casualty for which the Contractor is not responsible, or by combined action of workmen in no wise caused by or resulting from default or collusion on the part of the Contractor, then the time herein fixed for the completion of the work shall be extended for a period equivalent to the time lost by reason of any or all the causes aforesaid, which extended period shall be determined and fixed by the authorized representatives of the Owner, but no such allowance shall be made unless a claim therefore is presented in writing to the authorized representatives of the Owner within the time specified of the occurrence of such delay as contained in the specifications and plans.

ARTICLE VIII. It is hereby mutually agreed between the parties hereto that the sum to be paid by the Owner to the Contractor for said work and material shall be

subject to additions and deductions as herein provided, and that such sum shall be paid by the Owner to the Contractor in current funds and only upon certificates of the authorized representatives of the Owner as follows:

Except as otherwise specified in the Contract Documents,  
/ Ninety (90) percent of the actual cash value of all labor performed and material furnished in place each calendar month shall be paid on proper vouchers during the next succeeding calendar month, and the balance upon the full completion of the job.

If, at any time, there shall be evidence of any claim for which, if established, the Owner of the said premises might become liable, and which is an obligation chargeable to the Contractor, the Owner shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify it against such claim. Should there prove to be any such claim after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging any lien or claim on said premises in consequence of the Contractor's default.

It is further stipulated and agreed that out of any retained amounts, the Owner may at his option pay, in whole or in part, any just claim against the Contractor for labor or material furnished him by persons not parties hereto, where such labor or material has been expended in the carrying out of work covered by this agreement.

ARTICLE IX. It is further mutually agreed between the parties hereto that no certificate given or payment made under this contract, shall be conclusive evidence of the performance of this contract, either wholly or in part, and that no payment shall be construed to be an acceptance of defective work or improper materials.

ARTICLE X. The Owner, through its authorized representatives, has the power and duty to decide all questions as to the due performance of this contract.

The said parties, for themselves, their heirs, successors, executors, administrators and assigns, do hereby agree to the full performance of the covenants herein contained.

*In Witness Whereof*, the parties have hereunto set their hands and seals the day and year first above written, and caused these presents to be executed in their behalf by the Vice President, Finance, Planning and Operations of the University of Minnesota and the Contractor by its .....

*In the presence of:*

.....  
Witness Contractor  
.....  
Witness Contractor

REGENTS OF THE UNIVERSITY OF MINNESOTA

By.....  
Vice President, Finance, Planning and Operations

Recommended by:

.....  
Assistant Vice President Date  
.....  
Purchasing Agent Date  
.....  
University Attorney Date

UM Health Sciences  
JOML-A  
B1-4

# AGREEMENT

BETWEEN

Contractor

AND

Owner

FOR

19

AMOUNT OF CONTRACT

\$

# CONTRACTOR'S BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned \_\_\_\_\_

\_\_\_\_\_ of \_\_\_\_\_  
(Corporate or firm name of contractor) (Address of contractor)

a corporation,\* organized and existing under the laws of the State of \_\_\_\_\_, partnership,\* individual,\* duly authorized by law to do business as a construction contractor in the State of Minnesota, hereinafter called the "Principal," and \_\_\_\_\_

\_\_\_\_\_ of \_\_\_\_\_  
(Corporate name of surety) (Address of surety)

a corporation organized and existing under the laws of the State of \_\_\_\_\_, and duly authorized to do a surety business under the laws of the State of Minnesota, hereinafter called the "Surety," are held and firmly bound unto *Regents of the University of Minnesota*, hereinafter called the "Obligee," in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_),  
(Amount of contract price)

lawful money of the United States, for the payment of which well and truly to be made unto said Obligee, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents, as follows:

The conditions of this obligation are such that, whereas on the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, the said Principal entered into a written Contract with said Obligee for the construction of \_\_\_\_\_  
(Brief description of work to be done)

located at \_\_\_\_\_ as set forth in detail in the advertisement for bids, general conditions, information for bidders, proposal, plans and specifications, and other related contract documents referred to in said Contract, all of which are hereby made a part hereof, and by reference incorporated herein.

Now, THEREFORE, If the said Principal shall well and truly perform and complete said project in strict accordance with said Contract, advertisement for bids, general conditions, information for bidders, proposal, plans, specifications and related documents; shall comply with all the requirements of the Laws of the State of Minnesota; shall pay as they become due all just claims for work, tools, machinery, skill materials, insurance premiums, equipment and supplies, for the completion of the Contract in accordance with its terms; and shall defend, indemnify and save harmless said Obligee against any and all liens, encumbrances, damages, claims, demands, expenses, costs and charges of every kind, including patent infringement claims, except as otherwise provided in said specifications and other contract documents, arising out of or in relation to the performance of said work and the provisions of said Contract, then this Bond shall be void, otherwise it shall remain in full force and effect.

This obligation is made for the use of the Obligee and of all persons doing work or furnishing skill, tools, machinery or materials, or insurance premiums, or equipment, or supplies for any camp maintained for the feeding or keeping of men or animals, or any combination thereof, engaged under or for the purpose of the execution of said Contract and may be sued on thereby.

The said Surety, for value received, hereby stipulates and agrees that no assignment, modification or change, extension of time for completion, alteration or addition to the terms of said Contract or to the work to be performed thereunder or the specifications accompanying the same, shall in any wise affect its obligations on this Bond or release the Surety, and it does hereby waive notice of any such change, extension of time for completion, alteration or addition to the terms of the Contract as to the work or to the specifications.

IN TESTIMONY WHEREOF, the parties hereunto have caused the execution hereof in \_\_\_\_\_ original counterparts as of the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_.

(Seal, if any) \_\_\_\_\_, Principal  
Attest (or countersigned): \_\_\_\_\_  
(Name of contractor)

By \_\_\_\_\_

\_\_\_\_\_  
(Title) (Title)

(Seal) \_\_\_\_\_, Surety  
Attest (or countersigned): \_\_\_\_\_  
(Name of surety)

By \_\_\_\_\_

\_\_\_\_\_  
(Title) (Title)

\* Omit inapplicable terms.

(Acknowledgment by Natural Person)

STATE OF MINNESOTA,

County of \_\_\_\_\_ } ss.

On this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me personally appeared \_\_\_\_\_ to me known to be the person—described in and who executed the foregoing instrument, and acknowledged that \_\_\_\_\_ executed the same as \_\_\_\_\_ free act and deed.

My Commission expires \_\_\_\_\_

(Acknowledgment by Corporation)

STATE OF MINNESOTA,

County of \_\_\_\_\_ } ss.

On this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me appeared \_\_\_\_\_ to me personally known, who, being by me duly sworn, did say that he is the \_\_\_\_\_ of \_\_\_\_\_ corporation, and that the seal affixed to the foregoing bond is the corporate seal of said corporation, and that said bond was executed in behalf of said corporation by authority of its Board of Directors, and said \_\_\_\_\_ acknowledged said instrument to be the free act and deed of said corporation.

My Commission expires \_\_\_\_\_

(Justification by Sureties)

STATE OF MINNESOTA,

County of \_\_\_\_\_ } ss.

being each duly sworn, did each for himself depose and say that he is a resident and freeholder of the State of Minnesota and one of the sureties on the foregoing bond, and that he is worth the sum hereinafter set opposite his name over and above his debts and liabilities, and property exempt from execution.

Sworn to and subscribed before me } this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_ } \$ \_\_\_\_\_  
\$ \_\_\_\_\_  
\$ \_\_\_\_\_  
\$ \_\_\_\_\_

BOND OF

Contractor,

FOR WORK AT

The within Bond and sureties thereon approved and Bond filed \_\_\_\_\_, 19\_\_\_\_

Regents of the University of Minnesota

## DIVISION C - GENERAL CONDITIONS OF THE CONTRACT

Where any Article, Paragraph, Subparagraph or Clause of the General Conditions is modified, supplemented or deleted by other provisions of the Contract Documents, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect. Where provisions of the General Conditions are modified elsewhere in the Contract Documents, any references to those General Conditions provisions shall be read as referring also to the same subject matter contained elsewhere in the Contract Documents.

### ARTICLE I - THE CONTRACT DOCUMENTS

#### 1.1 Definitions

##### 1.1.1 The Contract Documents

The Contract Documents consist of the University-Contractor Agreement, the Performance Bond, the Instructions to Bidders, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, all Addenda issued prior to execution of the Contract, and all Modifications thereto. A Modification is (1) a written order or amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the University or Architect pursuant to Subparagraph 1.2.5, or (4) a written order for a minor change in the Work issued by the University or Architect pursuant to Paragraph 12.4.

##### 1.1.2 The Contract

The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1, except that changes to the Contract involving the Contract Sum or Contract Time, may be made only by Change Order.

##### 1.1.3 The Work

The term Work includes all labor and services necessary to produce and fully complete the construction required by the Contract Documents, and all materials and equipment incorporated in such construction.

##### 1.1.4 The Project

The Project is the total construction designed by the Architect, or designed by others in consultation or collaboration with the Architect and included in the Contract Documents, of which the Work performed under the Contract Documents may be the whole or a part.

##### 1.1.5 The Specifications

The Specifications include all Sections of Division 1, General Requirements, and all Sections of the Technical Divisions for the Project.

## 1.2 Execution, Correlation, Intent and Interpretations

1.2.1 The Agreement shall be signed in not less than triplicate by the University and Contractor. To the extent necessary, the Architect shall identify the Drawings and Specifications of the Contract Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents and Bidding Requirements. However, he does not represent having examined conditions that are not exposed without demolition unless the necessary demolition is specified or authorized by the University. The Contractor also represents he has examined all Contract Documents for the Project, including those intended for work or trades not normally performed by the Contractor's own forces, and has become thoroughly familiar with all conditions which may pertain to or affect the Work, and its costs, under this Contract.

1.2.3 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. The intention of the Documents is to include all labor, materials, equipment and other items as provided in Subparagraph 4.4.1 necessary for the proper execution and satisfactory completion of the Work, including proper operating condition. For any of the Work that is shown, indicated, noted or referred to in any of the Contract Documents, or is reasonably inferable therefrom as being necessary to produce the intended results, and which is not covered under any heading, section, branch, class or trade of the specifications, shall be provided in accordance with the Architect's instructions without additional cost to the University or Architect. Should there be an inconsistency in the quality or quantity of Work required under the Contract Documents, it shall be interpreted that the greater quality or quantity of Work is required under the Contract, without increase in the Contract Sum. Words which have well-known technical or trade meanings are used herein in accordance with such recognized meanings. The Contract Documents generally do not set forth the basis and analysis of design and the Contractor shall obtain such information as may be necessary to satisfactorily perform and complete the Work.

1.2.4 The organization of the Specifications into Divisions, Sections and Articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade, unless it is specified that a subcontract include specific phases or elements to complete a certain part of the Work for reasons of coordination or responsibility. Where the Specification has been divided into Sections, it is for convenience in use. The Architect and the University assume no responsibility for the placement of materials, equipment or other phases of the Work into the proper Division or Section of the Specifications, nor for the arrangement of Work shown on the Drawings. Neither the Architect nor the University shall be obligated to enter into any jurisdictional or other dispute as a result of the organization, arrangement or location of parts of the Work in the Specifications or Drawings, nor serve as an arbitrator to establish subcontract limits between the Contractor and any Subcontractor.



1.2.5 Written interpretations necessary for the proper execution of the Work, in the form of drawings or otherwise, will be issued with reasonable promptness by the Architect or the University and in accordance with any schedule agreed upon. In general, requests for interpretation of design intent shall be directed to the Architect. Either party to the Contract may make written requests to the Architect for such interpretations. Other requests for interpretation shall be directed to the University, who may consult with the Architect at its discretion. Interpretations shall be consistent with and reasonably inferable from the Contract Documents. The Contractor is responsible to request interpretations and clarifications for those matters which appear to be inconsistencies, ambiguities or omissions in the Contract Documents. The Contractor shall execute the Work in accordance with the decision, clarification or interpretation provided to him.

1.2.6 Where a reference in the Contract Documents to an American Society for Testing and Materials standard, American National Standards Institute standard, Federal Specification or other recognized standard does not include the date of the standard, the edition current as of the date of the Contract Documents shall apply.

1.2.7 The general character and scope of the Work is called for by the Contract Documents. Where a portion of the Work is fully drawn and the remainder is merely indicated, the portion fully drawn shall apply to all same parts of the Work. Drawings intended primarily as information for one trade may not necessarily show the work of other trades, but this shall not be construed as indicating there are no other related materials or adjacent work.

1.2.8 Figured dimensions shall be followed in preference to measurement by scale. In the event of discrepancies between dimensions, or between drawings, the intent shall be interpreted by the Architect, which shall be binding on the Contractor. Where a dimension may be missing, the Work shall be accomplished in accordance with the directions and dimensions provided by the University or the Architect. Dimensions on drawings, as well as detail drawings themselves are subject in every case to measurements of existing, adjacent, incorporated and completed work which shall be taken by the Contractor before undertaking any work depending upon such data. Dimensions pertaining to the Work or its installation shall be verified at site by the Contractor.

1.2.9 Where the Specifications are of the abbreviated or "streamlined" type, they shall be construed as complete sentences, as shall notes on the drawings. Omissions of words such as "the", "the Contractor shall", and "as shown on the drawings" is intentional. The words "shall" or "shall be" are to be supplied by inference. Imperative or directive instructions, directions or the Specifications apply to and refer to the Contractor. The words "symmetrical" and "similar" are used in the general sense and need not mean "identical." Where a number is specified (as for gauges, weights, temperatures, an amount of time, and similar references), and the specified number cannot be obtained, the number shall be interpreted as the next better, as available.

1.2.10 The Contractor shall examine all Contract Documents and use all specifications and drawings for the Project, including those that may

primarily pertain to other work the Contractor normally does not perform with his own forces. The Contractor shall use all of the Project drawings and specifications: for a complete understanding of the Project and his Work; to determine the type of construction and systems; for coordination; to determine what other work may be involved throughout; to anticipate and notify others when their coordinated efforts will be required; and all other relevant matters related to the Project and the Contractor's Work. The Contractor shall also be bound by all the requirements to complete his Work, that are applicable to, pertain to, or affect his Work, as may be shown or reasonably inferable from the entire set of drawings and specifications.

### 1.3 Copies Furnished and Ownership

1.3.1 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, a reasonable number of copies of Drawings and Specifications, as necessary for the execution of the Work.

1.3.2 The copies of all Drawings and Specifications furnished to the Contractor are and shall remain the property of the University. They are not to be used on any other project, and, with the exception of two contract sets, are to be returned to the University on request at the completion of the Work.

## ARTICLE 2 - THE ARCHITECT/ENGINEER

### 2.1 Definition

2.1.1 The Architect or Engineer is the design professional or organization whose name appears on the Contract Documents and identified as such in the Agreement, referred to throughout the Contract Documents as singular in number and masculine in gender. The term Architect, or Engineer, means the Architect, or Engineer, and his authorized representatives.

2.1.2 For reference ease, the term Architect is used in the General Conditions. For Contract Documents developed by the engineering disciplines, the term Engineer shall be substituted for Architect.

2.1.3 A Consultant is any person or firm who has provided specialized design services for the Project, in consultation or collaboration with the Architect or the University and whose design services are represented in the Contract Documents. The Consultant, or his representative, shall have the authority to make decisions on his design to the extent authorized by the Architect or the University.

2.1.4 Nothing contained in the Contract Documents shall create any contractual relationship between the Architect and the Contractor.

### 2.2 Administration of the Contract

2.2.1 During construction the Architect will advise, and consult with, the University in the general administration of the Contract, to the extent required by the University, acting on behalf of the University to the extent provided by the Contract Documents or otherwise authorized by the University.

2.2.2 The Architect, and the University, shall at all times have access

to the Work wherever it is in preparation and progress. The Contractor shall provide safe and convenient facilities for such access.

2.2.3 Periodically the Architect will visit the site to assist the University in the administration of the Construction Contract, to generally familiarize himself with the progress and quality of Work and to consult and advise the University on questionable matters in need of interpretation or modification. The Architect will not be required to make continuous, detailed or exhaustive on-site observations to check the quality or quantity of the Work.

2.2.4 The Architect and the University will not be responsible for construction means, methods, techniques, progress, sequences or procedures, or for safety precautions and programs in connection with the Work, and they will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

2.2.5 The Architect does not approve the Contractor's Request for Payment, but upon request may advise the University regarding the sums requested.

2.2.6 The Architect will, in the first instance, interpret the requirements of the Contract Documents and judge the Contractor's performance thereunder, when required by the University or the Contractor. The Architect will, within a reasonable time, render such interpretations as he may deem necessary for the proper execution or progress of the Work.

2.2.7 Claims, disputes and other matters in question between the Contractor and the University relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred to the Architect in writing for decision, which he will render within a reasonable time.

2.2.8 All interpretations and decision of the Architect shall be consistent with the intent of the Contract Documents. In his capacity as interpreter and judge, he will exercise his best efforts to insure faithful performance by both the University and the Contractor as required by the Contract Documents.

2.2.9 The Architect's decision in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

2.2.10 Any written decision by the Architect on a claim, dispute or other matter covered by such decision shall become final and binding on the Contractor and the University, without further appeal or recourse, thirty days after the decision is received by the parties unless written notice is served within the thirty days to the Architect and other party of the intent of further appeal or action.

2.2.11 The Architect, as well as the University, will have authority to reject Work which does not conform to the Contract Documents. Rejected Work shall be immediately removed from production or the site. Whenever, in the reasonable opinion of the Architect or the University it is considered necessary or advisable to insure the proper implementation of the intent of the Contract Documents, they shall have authority to require special inspection or testing of the Work in accordance with Subparagraph 7.8.2 whether or not such Work be then fabricated, installed or completed.

However, neither the Architect's or University's authority to act under this Subparagraph 2.2.11, nor any decision made by them in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Architect or the University to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

2.2.12 The Architect will review Shop Drawings and Samples as required in Subparagraph 4.13.1. Additionally, certain shop drawings and samples, as determined by the University, are also reviewed by the University.

2.2.13 The Architect will prepare Change Orders in accordance with Article 12, and will have authority to order minor changes in the Work as provided in Subparagraph 12.4.1.

2.2.14 The duties and limitations of authority of the Architect during construction as set forth in these General Conditions will not be modified or extended without written consent of the University and the Architect.

2.2.15 The Architect will not be responsible for the acts, procedures, programs, or omissions of the Contractor, any Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

2.2.16 In case of the termination of the employment of the Architect, the University shall appoint an architect whose status under the Contract Documents shall be that of the former architect.

### ARTICLE 3 - THE OWNER

#### 3.1 Definition

3.1.1 The Owner is the Regents of the University of Minnesota, a State of Minnesota Constitutional and Educational Corporation, herein referred to as the University.

3.1.2 The University acts through Clinton Hewitt, Assistant Vice President for Physical Planning, or his authorized representatives, except for certain functions which are the responsibility of the University's Purchasing Agent. Unless otherwise indicated, all papers and formal written notice required to be delivered to the University shall be delivered to Clinton Hewitt, Assistant Vice President, Room 340, Morrill Hall, University of Minnesota, Minneapolis, Minnesota 55455.

3.1.3 The University Purchasing Agent functions to receive bids for construction contracts and issues the Notice to Proceed to the successful Contractor.

3.1.4 The administration of the construction contract is performed by the Assistant Director of Planning of the Engineering and Construction Division of the University of Minnesota, or his authorized representatives.

3.1.5 At the commencement of the Work, the representatives of the University will be identified to the Contractor by name, function and authority.

### 3.2 Information and Services Provided by the University

3.2.1 Except as may otherwise be required by the Contract Documents, the University shall furnish all surveys describing the physical characteristics, legal limits and utility locations for the site of the Project.

3.2.2 The University shall secure and pay for easements for permanent structures or permanent changes in existing facilities.

3.2.3 For building projects, the University will establish a point locating one corner of the building on the site and furnish the location and elevation of a bench mark, all of which shall be verified by the Contractor.

3.2.4 The University shall select the appropriate testing agencies for the required tests, unless otherwise specified.

3.2.5 Information or services under the University's control shall be furnished by the University with reasonable promptness to minimize delay in the orderly progress of the Work.

3.2.6 During progress of the Work, the University will generally issue instructions to the Contractor, except for those instructions the University delegates to the Architect.

3.2.7 The foregoing are in addition to other duties and responsibilities of the University enumerated in the Contract Documents and especially those in respect to Payment and Insurance in Articles 9 and 11 respectively.

### 3.3 Administration of the Construction Contract

3.3.1 The University through its authorized representative will provide the general administration of the Construction Contract, functioning through a general, routine review and examination of the work to (1) judge the Contractor's performance of the Work under the Contract; (2) assist in avoiding defects, deficiencies and omission in the Work; (3) assist the Contractor in interpreting the Contract Documents, when necessary; (4) make determinations on questionable or ambiguous matters relating to the Work; (5) determine amounts due the Contractor for periodic payments; (6) make other judgments and determinations as may be necessary for the satisfactory completion of the Work to fulfill the intent of the Contract Documents.

3.3.2 The University will consult with the Architect at its discretion for interpretations, decisions on the quality of materials and workmanship, intent of the Contract Documents, progress of the Work and similar Contract matters, when necessary.

3.3.3 The University will receive and review the Contractor's submittals of the Performance Bond and insurance evidence.

3.3.4 The University will review the Contractor's progress schedule and reserves the right to question the schedule, comment on the schedule and require changes in the schedule to help assure proper scheduling to complete

the Work on time or benefit the overall progress of the Project. The University will provide the general coordination of schedules of separate contractors to assist in resolving possible conflicts of activities or priorities, but will assume no responsibility for the progress and completion of the Work by the Contractor.

3.3.5 The University will review certain shop drawings submitted to the Architect by the Contractor, prior to their being returned to the Contractor and the Contractor's timing of shop drawing submissions shall allow for the University review.

3.3.6 The University shall at all times have access to the Work, as provided in Subparagraph 2.2.2.

3.3.7 The University will be continuously represented at the site or, at its option, will visit the site and review the Work at such times and frequency it deems necessary to be familiar with the general progress and to generally determine if the Work is in accordance with the Contract Documents. The University will not be responsible to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work, which shall be the Contractor's responsibility.

3.3.8 The University, in consultation with the Architect when appropriate, will decide on proposed Changes in the Work.

3.3.9 The University will review the Contractor's Request for Payment and determine the amounts due the Contractor, based on the Contract requirements and the University's evaluation of the progress of the Work.

3.3.10 Requests for required interpretations, clarifications and similar matters arising out of the Contract Documents, or the construction, shall first be made to the University, who will consult with the Architect when necessary or advisable. The University's interpretation and decisions shall be consistent with the intent of the Contract Documents.

3.3.11 The University shall have the right and authority to reject any of the Work and to order special inspections or testing, in accordance with Subparagraph 2.2.11.

3.3.12 The University will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and review written guarantees and related documents required by the Contract and assembled by the Contractor.

3.3.13 The University shall not be responsible for the Contractor's activities as specified under Subparagraph 2.2.4. Neither the titles nor functions of the University, or the Architect, and their representatives shall be construed as (1) assuming or imposing any of the Contractor's responsibilities on the University or Architect; (2) supervising the Work under the Contract Documents; (3) being responsible in any way for the performance, acts, omissions or inaction of the Contractor, his Subcontractors, anyone employed directly or indirectly by any of them or any one for whose acts they may be liable.

### 3.4 University's Right to Stop the Work

3.4.1 If the Contractor fails to correct defective Work or persistently fails to supply materials or equipment in accordance with the Contract Documents, does not allow others sufficient time to perform their work or otherwise is in substantial violation of the Contract, the University may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

### 3.5 University's Right to Carry Out the Work

3.5.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision of the Contract, the University may, after seven days' written notice to the Contractor and his Surety, require the Surety to assume the obligations of the Contractor to complete the Work under the terms of the Contract. Should the Surety fail to assume the obligations within ten days after receipt of the written notice, the University, without prejudice to any other remedy it may have, may make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor, or the Surety, the cost of correcting such deficiencies, including the cost of the Architect's additional services made necessary by such default, neglect or failure. The Architect shall approve both such action and the amount charged to the Contractor. If the payments then or thereafter due the Contractor, or the Surety, are not sufficient to cover such amount, the Contractor or his Surety shall pay the difference to the University.

## ARTICLE 4 - THE CONTRACTOR

### 4.1 Definition

4.1.1 The Contractor is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

### 4.2 Review of Contract Documents

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the University any error or alleged error, inconsistency or omission he may discover. The Contractor shall obtain necessary drawings, specifications or instructions when required to satisfactorily complete any of the Work which is questionable.

### 4.3 Supervision and Construction Procedures

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences, programs, safety and procedures and for coordinating all portions of the Work under the Contract.

### 4.4 Labor and Materials

4.4.1 Unless otherwise specifically noted, the Contractor shall provide all labor, material, equipment, facilities, systems, tools, temporary

facilities, services and related items to properly execute and satisfactorily complete the Work.

4.4.2 The Contractor shall employ and assign labor that is skilled and competent in the assigned tasks and shall maintain order and discipline among his employees

4.4.3 The Contractor shall provide and perform all Work to comply with the requirements of the Contract Documents.

#### 4.5 Warranty

4.5.1 The Contractor warrants to the University and the Architect that all materials and equipment furnished under the Contract, as a permanent part of the Project, will be new unless otherwise specified, and that all Work will be of first quality as acceptable to the University and Architect, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards may be considered defective. If required by the University or the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

#### 4.6 Taxes

4.6.1 The Contractor shall pay all sales, excise, consumer, use and other similar taxes required by law.

#### 4.7 Permits, Fees and Notices

4.7.1 The Contractor shall obtain and pay for all permits, fees, licenses or other charges required or bearing on the conduct of the Work, where property other than University property is involved (i.e. municipalities, other governmental units, utilities) including connections to water, sewer or other utilities, or where sidewalks, streets and alleys not on University property must be disturbed or used. Other required permits and licenses applicable to University property will be obtained or provided by the University without cost to the Contractor.

4.7.2 The Contractor shall give all notices and comply with all codes, laws, ordinances, rules and regulations of any public authority having jurisdiction which bears on the performance of the Work.

#### 4.8 Cash Allowances

4.8.1 By executing the Agreement, the Contractor represents the Contract Sum includes all cash allowances stated in the Contract Documents.

#### 4.9 Superintendent

4.9.1 The Contractor shall employ a competent Superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The Superintendent shall be satisfactory to the University and Architect, and shall not be changed except with the consent of the University, unless the Superintendent proves to be unsatisfactory



to the Contractor and ceases to be in his employ. The Superintendent shall be the executive representative of the Contractor and all communications given to the Superintendent shall be as binding as if given to the Contractor. When requested by the Contractor, important communications will be confirmed in writing.

4.9.2 Unless specifically approved by the University, the Contractor's Superintendent shall be constantly present during all working hours from start to completion of the Work, including those times when only Subcontractors are performing work at the site or minor activity is in progress. During the final stages of completion of the Work, the Superintendent shall continue to be constantly present at the site during all working hours to expedite, coordinate and direct the Work to final completion.

#### 4.10 Responsibility for Those Performing the Work

4.10.1 The Contractor shall be responsible to the University for the acts and omissions of all his employees and all Subcontractors, their agents and employees, and all other persons performing any of the Work under a contract with the Contractor.

#### 4.11 Progress Schedule

4.11.1 The Contractor shall prepare and submit for University approval, the progress schedule required by the Contract Documents.

#### 4.12 Drawings and Specifications at The Site

4.12.1 The Contractor shall maintain at the site for his use and that of the University one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other Modifications, in good order and marked to record all changes made during construction. These shall be available to the University and the Architect.

#### 4.13 Shop Drawings and Samples

4.13.1 The Contractor shall provide and submit all shop drawings and samples required by the Contract Documents.

#### 4.14 Use of Site

4.14.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the Contract Documents or the University's directions and shall not unreasonably encumber the site with any materials, equipment or debris.

#### 4.15 Cutting and Patching of Work

4.15.1 The Contractor shall do all cutting, fitting or patching of his Work that may be required to make its several parts fit together properly, and shall not endanger any work by cutting, excavating or otherwise altering the Work or any part of it.

#### 4.16 Cleaning Up

4.16.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.

4.16.2 At the completion of the Project, the Contractor shall perform all cleaning to leave the Work "thoroughly clean" as required by the Contract Documents, unless otherwise specified.

4.16.3 If the Contractor fails to maintain the premises or clean up as specified, the University may do so after two days notice, with the cost paid for by the Contractor.

#### 4.17 Communications

4.17.1 The Contractor shall provide to the Architect a copy of all communications to the University.

#### 4.18 Indemnification

4.18.1 The Contractor shall indemnify and hold harmless the University and the Architect and their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

4.18.2 In any and all claims against the University or the Architect or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

4.18.3 The obligations of the Contractor under this Paragraph 4.18 shall not extend to the liability of the Architect, his agents or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the University or the Architect, their agents or employees provided such giving or failure to give is the primary cause of the injury or damage.

## ARTICLE 5 - SUBCONTRACTORS

### 5.1 Definition

5.1.1 A Subcontractor is a person or organization who has a direct contract with the Contractor to perform any of the Work at the site, or to furnish materials, equipment or systems specifically fabricated for the Work. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative.

5.1.2 A Sub-subcontractor is a person or organization who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site or to furnish materials, equipment or systems specifically fabricated for the Work. The term Sub-subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.

5.1.3 Nothing contained in the Contract Documents shall create any contractual relation between the University or the Architect and any Subcontractor or Sub-subcontractor.

### 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

5.2.1 Unless another time is specified in the Contract Documents, within 14 days after notice of award of the Contract, letter of intent to award, Notice to Proceed, or execution of the Contract, whichever occurs first, the Contractor shall furnish to the Architect in writing, for acceptance by the University and the Architect, a list of the names of all Subcontractors, and their Sub-subcontractors where appropriate, he proposes to use for the Work. No subcontracts shall be finally executed until the list has been reviewed by the University and Architect and the Contractor notified of the acceptance or non-acceptance of those listed. The Architect shall, with reasonable promptness, notify the Contractor if either the University or the Architect does not accept any Subcontractor or Sub-subcontractor on the list. At the request of the University or the Architect, the Contractor shall submit the names of proposed Subcontractors or Sub-subcontractors for portions of the Work not on the list. The listed Subcontractors or Sub-subcontractors will be deemed acceptable unless the Contractor is notified of the University's or Architect's objection or non-acceptance within a reasonable time established by the Contractor and the Architect.

5.2.2 The proposed Subcontractors or Sub-subcontractors shall be established, reputable firms of recognized standing with a record of successful and satisfactory past performance with the type work and/or items proposed to be provided or furnished by them. Where specifically named Subcontractors may be specified for certain portions of the Work, only the specified Subcontractors will be acceptable for those parts of the Work.

5.2.3 The right to reject any Subcontractor or Sub-subcontractor will be exercised by the University or the Architect when, in their opinion, it is believed the proposed Subcontractor or Sub-subcontractor: (1) cannot provide, or proposes deviations in, materials, equipment, systems, methods,

facilities or other Work as required by the Contract Documents; (2) cannot provide labor and skill necessary to accomplish the part of the work for which he is proposed, including but not limited to quality of workmanship; (3) lacks experience appropriate to the proper execution and completion for that part of the Work for which he is proposed; (4) has previously failed to perform satisfactorily, including cooperation and necessary services after project completion; (5) cannot satisfactorily perform the part of the Work for which he is proposed within the time schedule, due to financial status, size of organization, existing work load, or other considerations; (6) cannot demonstrate his ability, through examples of representative work, to perform the part of the Work for which he is being considered; (7) is of questionable integrity; or (8) there are other considerations bearing on the probability of unsatisfactory performance.

5.2.4 The Contractor shall not contract with any Subcontractor, nor use any Sub-subcontractor or any person or any organization (including those who are to furnish materials, equipment, systems or other items fabricated specially for the Work) who has been rejected by the University or the Architect. Except whereby the submission of the bid by the Contractor under the conditions of the Contract Documents indicates or implies he has accepted the use of a particular specified Subcontractor, the Contractor will not be required to contract with any Subcontractor or person or organization against whom he has a reasonable objection.

5.2.5 If the University or Architect refuses to accept any Subcontractor or person or organization on a list submitted by the Contractor in response to the requirements of the Contract Documents or the Instructions to Bidders, the Contractor shall submit an acceptable alternative.

5.2.6 If the University or the Architect requires a change of any proposed Subcontractor, Sub-subcontractor or person or organization previously accepted by them, the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. No increase in the Contract Sum will be allowed where the change is a result of subsequent evidence of any of the reasons for rejection under 5.2.3.

5.2.7 The Contractor shall not make any substitution for any Subcontractor, Sub-subcontractor or person or organization who has been accepted by the University and the Architect, except for just cause acceptable to the University and the Architect, and unless the substitute is acceptable to the University and the Architect. In the event of a proposed change, the Contractor shall submit, in writing, the reasons for the change and the proposed substitutions. No change will be allowed for the improvement of the schedule where the Contractor, or his Subcontractors, have failed to properly order or schedule delivery or installation of materials and equipment. The proposed change is subject to all conditions of Paragraph 5.2.

### 5.3 Subcontractual Relations

5.3.1 All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate agreement between the Contractor and Subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

- .1 Preserve and protect the rights of the University and the Architect under the Contract with respect to the Work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;

- .2 Require that such Work be performed and guaranteed in accordance with the requirements of the Contract Documents.
- .3 Require submission to the Contractor of applications for payment under each subcontract to which the Contractor is a party, in reasonable time to enable the Contractor to apply for payment in accordance with Article 9;
- .4 Require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to sub-contracted portions of the Work shall be submitted in writing to the Contractor (via any Subcontractor or Sub-subcontractor where appropriate) in sufficient time so that the Contractor may comply in the manner provided in the Contract Documents for like claims by the Contractor upon the University;
- .5 Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance described in Paragraph 11.2, except such rights as they may have to the proceeds of such insurance held by the Trustee for the insurance proceeds, and
- .6 Obligate each Subcontractor specifically to consent to the provisions of this Paragraph 5.3.

#### 5.4 Payments to Subcontractors

5.4.1 The Contractor shall pay each Subcontractor, upon receipt of payment from the University an amount equal to the percentage of completion allowed to the Contractor on account of such Subcontractor's Work, less the percentage retained from payments to the Contractor. The Contractor shall also require each Subcontractor to make similar payments to his subcontractors.

5.4.2 If the University fails to make payment for any cause which is the fault of the Contractor and not the fault of a particular Subcontractor, the Contractor shall pay that Subcontractor on demand, made at any time after the payment should otherwise have been made, for his Work to the extent completed, less the retained percentage.

5.4.3 The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor under Article 11, and he shall require each Subcontractor to make similar payments to his subcontractors.

5.4.4 The University may, on request and at its discretion, furnish to any Subcontractor, if practicable, information regarding percentages of completion certified to the Contractor on account of Work done by such Subcontractors.

5.4.5 Neither the University nor the Architect shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor.

#### ARTICLE 6 - SEPARATE CONTRACTS

##### 6.1 University's Right to Award Separate Contracts

6.1.1 The University reserves the right to award other contracts in

connection with other portions of the Project under these or similar Conditions of the Contract.

6.1.2 When separate contracts are awarded for different portions of the Project, "the Contractor" in the Contract Documents in each case shall be the Contractor who signed each separate contract.

## 6.2 Mutual Responsibility of Contractors

6.2.1 The Contractor, and his Subcontractors, shall cooperate with and coordinate their work with each other and all other contractors and the University to facilitate general progress of the Project and to prevent delaying the progress of other contractors. The Contractor shall give reasonable notice and afford other contractors reasonable opportunity for the introduction and storage of their materials and equipment and the installation or execution of their work, and shall properly connect and coordinate his Work with theirs. The Contractor, and his Subcontractors, shall obtain layout drawings, roughing-in detail sheets and other pertinent information directly from the other contractors to coordinate all phases of the Work, and all contractors shall within a reasonable time provide such necessary information. For coordination with the University's equipment or materials, information shall be obtained from the University. After timely notification by the Contractor of the need to accomplish a particular phase or element of the Work, the other contractors shall, within a reasonable time, perform their work so as not to delay or impede the Contractor.

6.2.2 If any part of the Contractor's Work depends for proper execution or results upon the work of any other separate contractor, the Contractor shall inspect, including measurements and inspection of work already in place, and shall promptly report to the University any apparent or alleged discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor so to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper to receive his Work, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's Work.

6.2.3 Should the Contractor cause delay or damage to the work or property of any separate contractor on the Project, the Contractor shall, upon due notice, settle with such other contractor by agreement or arbitration, if he will so settle. If such separate contractor sues the University on account of any delay or damage alleged to have been so sustained, the University shall notify the Contractor who shall defend such proceedings at the Contractor's expense, and if any judgment or award against the University arises therefrom the Contractor shall pay or satisfy it and shall reimburse the University for all attorney's fees and court costs which the University has incurred.

## 6.3 Cutting and Patching Under Separate Contracts

6.3.1 The Contractor shall be responsible for any cutting, fitting and patching that may be required to complete his Work except as otherwise

specifically provided in the Contract Documents. The Contractor shall not endanger any work of any other contractors by cutting, excavating or otherwise altering any work and shall not cut or alter the work of any other contractor except with the written consent of the Architect or the University.

6.3.2 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefor.

#### 6.4 University's Right to Clean Up

6.4.1 If a dispute arises between the separate contractors as to their responsibility for cleaning up as required by Paragraph 4.16, or elsewhere in the Contract Documents, the University may clean up and equitably charge the cost thereof to the several contractors.

### ARTICLE 7 - MISCELLANEOUS PROVISIONS

#### 7.1 Governing Law

7.1.1 The Contract shall be governed by the laws of the State of Minnesota.

#### 7.2 Successors and Assigns

7.2.1 The University and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the University.

#### 7.3 Written Notice

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice. Written notice to the University shall be addressed as noted under Sub-paragraph 3.1.2.

#### 7.4 Claims for Damages

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

#### 7.5 Performance/Guaranty Bond

7.5.1 At the time of execution of the Agreement between the University and the Contractor, the Contractor shall furnish a Bond in the full amount of the Contract Sum, signed by the Contractor and a Corporate Surety authorized to provide bonds in the State of Minnesota and approved by the University. A valid and enforceable Bond shall be maintained by the Contractor throughout the life of the Contract and its Guarantee Periods.

7.5.2 The minimum requirement for University approval of the Surety shall be that the Surety is listed by the United States Treasury Department as acceptable for bonding Federal projects and that the bond amount is within the limit set by the Treasury Department as the net limit on any single risk. There shall be no affiliation between the Contractor and the Bonding Agent or Agency.

7.5.3 The Bond shall guarantee the Contractor will perform each and every part of the Contract, cover all guarantees called for and insure prompt payment to all persons furnishing material or labor required in prosecution of the Work under the Contract. In the event of additions to the Contract, the University reserves the right to require evidence of additional bond.

7.5.4 The Bond shall provide: (1) for additions or deductions from the Work in any amount; (2) that completion time shall not be extended by reason of such changes, unless agreed to at time of change; (3) that no notice of aforesaid alterations, additions or omissions need be given the Surety; and (4) permit occupancy by the University at any time.

7.5.5 Unless otherwise stipulated in the Contract Documents or Bidding Requirements, the form of bond shall be provided by the University. (Contractor's Bond, Business Administration Form 204).

7.5.6 If it shall at any time appear that Contractor has unlawfully, fraudulently or through collusion with any representative of University, supplied inferior materials or workmanship or has departed from the terms of the Contract, or should the University make a claim under the Guarantee provisions, the final inspection and acceptance of the Work shall not be binding on the University and the University shall have the right to cause the Work to be properly performed and satisfactory material supplied to the extent the University may deem necessary, all at expense of the Contractor or his Surety. The University shall have right to recover against the Contractor, or his Surety, such damages as may be incurred by the University therefrom.

7.5.7 Final acceptance of the Work shall not relieve the Contractor nor his Surety from their obligations under this Contract, including guarantees of materials, equipment, installation or service.

## 7.6 Rights and Remedies

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

## 7.7 Royalties and Patents

7.7.1 The Contractor shall pay all royalties and license fees and shall secure to the University for all times the free and undisputed right to the use of any and all patented design, process, method or product used in performance of the Work. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the University harmless from loss on account thereof.



## 7.8 Tests

7.8.1 If the Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, or instructions of the University or Architect requires any of the Work to be inspected, tested or approved, the Contractor shall make all arrangements for the tests, inspections or approvals and notify all appropriate parties in ample time to make the inspections, tests or approvals. The Contractor shall give the University and Architect timely notice of readiness for testing and inspection and the dates set for tests, inspections and approvals by public authorities so they may observe such tests and inspections if they choose. The Contractor shall bear all costs of such inspections, tests or approvals except as otherwise specified in the Contract Documents. Any of the Work requiring testing, inspection or approval which is covered or otherwise made inaccessible without the consent of those requiring or making the inspection or test, shall be uncovered or made accessible by and at the expense of the Contractor.

7.8.2 If after the commencement of the Work the University or the Architect determines that any Work requires special inspection, testing, or approval which Subparagraph 7.8.1 does not include, the University may instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as in Subparagraph 7.8.1. If such special inspection or testing reveals a failure of the Work to comply (1) with the requirements of the Contract Documents, or (2) with respect to the performance of the Work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, including the Architect's additional services made necessary by such failure; otherwise the University shall bear such costs, and an appropriate Change Order shall be issued.

7.8.3 Certificates of required inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the University and the Architect.

7.8.4 Neither the observations by the University or the Architect, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the Work in accordance with the Contract Documents.

## 7.9 (Not Used)

## 7.10 Use of University Personnel and Property

7.10.1 Unless the Contract Documents call for University property to be supplied to the Contractor, or installed or connected by the Contractor under the Contract, no property, supplies, equipment or personnel of the University shall be used by the Contractor in the performance of the Contract.

## 7.11 University Use or Occupancy of the Premises

7.11.1 The University reserves the right to jointly use the premises with the Contractor in the performance of his duties and functions. The University reserves the right to: (1) enter into the Project and premises at all

times; (2) make installations of materials and equipment at appropriate times as the Work progresses; (3) store property in essentially completed areas; (4) install furniture and furnishings when spaces are at appropriate stages of completion; (5) and use the premises for other similar activities. The Contractor shall coordinate the Work with the work of the University or other contractors and shall cooperate with them, to minimize undue interferences. Such activities shall not be construed as occupancy.

7.11.2 If any part, unit or the entire Work or Project is Substantially Complete or ready for occupancy, the University may, upon notice to the Contractor, enter into and make use of the Work that is Substantially Complete or otherwise suitable for the University's purposes.

7.11.3 If the Work is not complete at the time included in the Contract, but the Work is to a state of readiness to permit partial or full use or occupancy by the University, the University reserves the right, upon notice to the Contractor, to enter into and make use of those parts that are suitable for his needs. The Contractor shall cooperate with and coordinate his operations in completing the Work with the University to minimize disturbance of the University's programs and functions.

7.11.4 The University's beneficial use or occupancy, as provided for in 7.11.1 through 7.11.3 shall not be construed as acceptance of the Work or any of its materials and equipment. Such use and occupancy shall be subject to any corrections or deficiencies, damage or omissions noted. Damage occurring after occupancy, not caused by the Contractor, will be the responsibility of the University or other contractors causing the damage.

7.11.5 To the extent applicable to the Work, as determined by the University, the Contractor shall conform to the provisions of this Subparagraph. Upon occupancy by the University, complete and usable facilities of light, power, exits, heat, ventilation, air conditioning, utilities, toilets and similar facilities necessary for safety, comfort and University's functions shall be available at all times, so the Work can be used without hazards, discomfort or inconvenience. After occupancy by the University, its program, functions or normal use shall not be unnecessarily interrupted nor interfered with and unnecessary inconvenience will not be permitted. The Contractor shall schedule and arrange the Work with the University to accomplish this objective. If the Work is not complete by the time in the Contract, and if necessary, work shall be scheduled on weekends, or other times when the Work is not in use, without additional cost to the University. The Contractor will be allowed reasonable access to the areas as necessary to complete the Work. All operations or activities relating to electrical, heating, air conditioning, ventilation, plumbing services and phases shall be accomplished in accordance with a sequence schedule planned with the University so that complete facilities are maintained.

## 7.12 Additional Definitions

7.12.1 The term "provide" shall mean to furnish and install complete, including as applicable all connections to utilities or service, complete anchorage and suspension, fastening or anchor devices, controls, trim, supports, standard accessories, finishes, adjustments for proper operation and other related items or labor, unless specifically specified otherwise.

7.12.2 The terms "Approved," "Satisfactory," "Equal to," "Proper," and similar terms shall mean the decision is vested in the Architect and the University, which shall be binding upon the Contractor and Subcontractors. For decisions relating to artistic effect or interpretation and intent of the Contract Documents, the Architect's decision will be final.

7.12.3 The terms "Project," "Work," "Job", as may be used in the technical sections of the Specifications or on the drawings, may be used interchangeably and are synonymous. They shall mean the facility, construction and/or improvement within the intent or scope of the Contract Documents. The terms shall mean the entire facility, or separable parts as appropriate to the use of the term.

7.12.4 The term "Notice to Proceed" shall mean written notice by the University to the Contractor to commence his work of the Contract, issued either before or after execution of the Contract. In issuing the Notice, stipulations may be included in the Notice, or in the Contract Documents, as to time and other requirements that may condition commencement of the Work at the site. In the absence of a specific Notice to Proceed, the execution of the Agreement shall be deemed as such Notice, conditional upon the submission of a proper Performance Bond and proper insurance evidence.

7.12.5 The term "Substantial Completion" shall mean the Work of the Contract (or separable units or phases as provided in the Contract Documents or otherwise determined by the University) is essentially and satisfactorily complete in accordance with the Contract Documents, as modified by approved Change Orders or other written orders, ready for full occupancy or use by the University in the manner intended without inconvenience or discomfort. The determination by the University on the status of Substantial Completion shall be final. As may be applicable to this Project and Work of this Contract, it is the intent that Substantial Completion shall generally mean: all materials, equipment, systems, controls, features, facilities, accessories and similar elements are installed in the proper manner and in operating condition; spaces and surfaces (except minor areas or spaces) have been painted or otherwise finished throughout; masonry and concrete cleaned with any sealer or other finish applied; casework installed, complete with tops, sinks, fittings and other related items installed and services connected; utilities and systems connected and functioning; sitework essentially complete; permanent heating, ventilating, air conditioning and other systems properly operating with proper controls; lighting and electrical systems installed, operable and controlled; and other work to a similar state of essential and satisfactory completion. A minor amount of work, as determined by and at the discretion of the University, such as installation of minor accessories or items, a minor amount of painting, minor replacements of defective work, minor adjustment of controls, completion or correction of minor exterior work that cannot be completed due to weather conditions, will not delay determination of Substantial Completion. For the purposes of Substantial Completion, specified areas of the entire Work or Project (or as otherwise determined by the University) may be individually judged as Substantially Complete.

7.12.6 The terms "Complete", "Completion" or "Final Completion" shall mean when all of the Work of the Contract fulfills all of the terms of the Contract Documents in all respects.

### 7.13 Or Equal

7.13.1 Wherever materials, products, articles, equipment, systems or similar items are identified by reference to proprietary terms, model numbers, catalog numbers, trade names, manufacturers or similar reference, it is intended to establish the minimum standard or measure of quality that has been determined as requisite or intended for the Work. During bidding competition is encouraged from contractors, subcontractors, suppliers, manufacturers and producers whose products, systems, reputation, performance and service warrant acceptance for the conditions, intent of design, requirements and other considerations of the Work under the conditions specified in the Instructions to Bidders. Where not specifically stated, the phrase "or acceptable equal as determined by the Architect" shall be implied throughout. The Architect consults with the University in the determination of products to be used and their acceptable equals.

7.13.2 The determination of products for use may be based on the construction, design, function, type, size, capacity, performance, strength, durability, efficiency, sound level, finish, aesthetic quality, service, matching existing work, the University's standards for repair, replacement and maintenance or other characteristics and criteria. Acceptance or rejection of proposed alternate or similar products, equipment or system may be based on any of the factors and criteria. The final decision on acceptance or rejection of proposed alternate or similar products, equipment or system shall be vested in the Architect and his determination may or may not express the reason for the decision, at his option.

7.13.3 The product, equipment, system or manufacturer used as the basis for the design or specification shall generally set the criteria. It shall be expressly understood that any product, equipment, system or manufacturer listed in the Contract Documents as acceptable shall meet and be in full compliance with the requirements and criteria, including those established by the product, equipment, system or manufacturer used as the basis for the specification. The Architect and the University shall have the right to reject any proposed deviations from specified criteria or characteristics, or deviations from the criteria and characteristics of the product, system or manufacturer used as the basis of the Contract Documents.

## ARTICLE 8 - TIME

### 8.1 Definition

8.1.1 The Contract Time is the period of time allotted in the Contract Documents for completion of the Work.

8.1.2 The date of the commencement of the Contract Time is the date of the University's Notice to Proceed or the date of the Agreement, whichever is first. In the absence of a time or date established in the Notice to

Proceed or in the Contract Documents, work at the site shall commence within 21 days after the Notice to Proceed or Contract execution, whichever occurs first, unless a later time is agreed to or directed by the University.

8.1.3 The date of Substantial Completion of the Work or designated portion thereof is the date determined by the University when construction is sufficiently complete, in accordance with the Contract Documents, so the University may occupy the Work or designated portion thereof for the use for which it is intended and the Work meets the requirements of Subparagraph 7.12.5. The date of Final Completion shall be determined by the University when the Work meets the requirements of Subparagraph 7.12.6.

8.1.4 The term day as used in the Contract Documents shall mean calendar day.

## 8.2 Progress and Completion

8.2.1 All time limits or dates stated in the Contract Documents are essential conditions of the Contract. In executing the Contract, the Contractor agrees the Contract Time is reasonable for the Work.

8.2.2 The Contractor shall begin the Work in accordance with Subparagraph 8.1.2. No work at the site shall be commenced until proper evidence of the required insurance has been submitted to the University. The Contractor shall carry the Work forward expeditiously with adequate forces to maintain progress in accordance with the Progress Schedule and to complete the Work within the Contract Time.

8.2.3 Except for constraints which may be specified for certain part of the Work or otherwise imposed by the University, the Work shall not be suspended or shut down, but shall progress continuously and expeditiously, unless otherwise approved by the University. The Contractor shall assemble materials and equipment in advance of the need and, as may be appropriate to the progress, shall prefabricate assemblies which will comply with the Contract Documents, as may be specified, or if not specified as may be permitted by labor agreements, to expedite the Work and insure completion on time.

8.2.4 If completion dates or times are specified or otherwise included in the Contract, it shall mean the date of Final Completion as defined under Subparagraph 7.12.6, unless otherwise specified in the Contract Documents.

8.2.5 If the Contractor shall neglect, fail or refuse to complete the Work within the time specified, or any proper extensions thereof granted by the University, unless liquidated damages are specified, the Contractor will be subject to paying actual damages suffered by the University resulting from non-completion on time and default under the Contract.

## 8.3 Delays and Extensions of Time

8.3.1 If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the University or the Architect, or by any employee of either, or by any separate contractor employed by the University,

or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, unavoidable casualties or any causes beyond the Contractor's control, or by any other cause which the University determines may justify a delay, the Contract Time may be extended by Change Order for such reasonable time as the University may determine. Claims for extensions of time will be considered valid only under the following conditions:

- .1 Only those enumerated conditions over which the Contractor has no control will be considered. The burden of proof to substantiate the claim for an extension of time shall rest with the Contractor, including evidence that the cause was beyond his control. It shall be deemed the Contractor has control over the supply of labor, materials, equipment, methods, techniques and over his Subcontractors.
- .2 A delay in the progress of the Work actually occurred as a result of one of the valid causes for time extension.
- .3 Any unusual delay in transportation is solely due to transportation. An extension of time will not be granted for delays in deliveries where said delivery was not properly scheduled or when orders were not promptly and properly placed.
- .4 With respect to a claim for an extension of time as result of climatic conditions, the Contractor shall consider the location of the site and recognize the existence, as normal, of variations from "average" conditions. Foul weather in itself will not be a valid reason for time extension. Requests for time extension because of delay resulting from weather extremes will not be considered unless a substantial variation from usual weather conditions occurs for a significant period of time and operations necessarily were suspended to a significant degree when they would otherwise have been in progress. In considering the time extension, the weather conditions both before and after the period in which the delay is claimed will be evaluated.
- .5 For Changes in the Work which significantly affects the time and progress of the entire Work, any time extension shall be made no later than when the Change is authorized by the University. Any claim shall be made at the time the Change is requested. For Changes in the Work which do not affect the progress of the entire Work, the University reserves the right to grant a time extension only for the area, phase or element of the entire Work affected by the Change.
- .6 Delays resulting from a labor dispute will result in a time extension no longer than the dispute period, in addition to a reasonable mobilization period that is unavoidable, and may be less depending on the actual affect the dispute had on the overall progress and the operations that were actually curtailed or suspended. Lockouts, over which the Contractor has control, will not be a valid reason for a time extension.

- .7 No time extension will be granted as a result of improper scheduling or for failure to have shop drawings or samples submitted in ample time for review under a reasonable schedule.
- .8 Delays caused by Subcontractors will be valid reasons for time extension only under the same conditions as Paragraph 8.3.

8.3.2 Except for Changes in the Work, all claims for extension of time shall be made in writing to the University no more than ten days after the beginning of the occurrence of the delay; otherwise they shall be waived. In the case of a continuing cause of delay only one claim is necessary.

8.3.3 If no schedule or agreement is made stating the dates upon which written interpretations as set forth in Subparagraph 1.2.5 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after demand stating a delay will result is made for them, and not then unless such claim is reasonable.

8.3.4 All extensions of time shall be determined by the University, in consultation with the Architect when necessary, and its decisions shall be final and binding.

8.3.5 In the event of separate contractors for the Work, if a time extension is granted to one or more contractors for a valid delay, a time extension may also be granted other contractors if, in the opinion of the University, their progress or work schedule is materially affected by the time extension granted. If no time extension is allowed to the Contractor, or should the Contractor decline a time extension offer, the Contractor shall make no claim against the University for damages alleged to be the result of any time extension granted to others.

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

## ARTICLE 9 - PAYMENTS AND COMPLETION

### 9.1 Contract Sum

9.1.1 The Contract Sum is stated in the Agreement and is the total amount payable by the University to the Contractor for the performance of the Work under the Contract Documents.

### 9.2 Schedule of Values and Cash Flow Schedule

9.2.1 Unless otherwise specified, the Contractor shall submit a Schedule of Values (cost breakdown) at least 14 days prior to the first Request for Payment, in such form and detail as required by the Contract Documents and as directed by the University.

9.2.2 Upon request of the University, the Contractor shall prepare and provide a schedule of estimated periodic requests for payment for the University's guidance in its financial planning to have funds available.

The schedule shall indicate the anticipated amount that will be requested each month, taking into consideration the work schedule, expected deliveries and the retained amount. The Contractor will not be bound to the estimated amounts, but should the actual requested amounts tend to vary substantially from the estimates, the Contractor shall revise the schedule, at the request of the University.

### 9.3 Progress Payments

9.3.1 As the Work progresses, after a bona-fide start at the site, the Contractor may make periodic Requests for Payment, but no more often than monthly, for work satisfactorily completed or materials suitably stored and protected at Project site, or as otherwise provided under Subparagraph 9.3.5. With the Request for Payment, the Contractor shall provide such supporting data as may be required by the University to substantiate the Contractor's right to payment.

9.3.2 Requests for Payment shall be submitted to the University in five copies on forms provided by the University. Each periodic payment request shall be in itemized detail form, following the Schedule of Values accepted by the University and as directed by the University. The processing procedures and time for submitting Requests for Payment shall be as directed by the University.

9.3.3 Payment will be made only for the Work that has been satisfactorily executed or accomplished and, except as provided for under Subparagraph 9.3.5, only for materials and equipment that are on the job site and adequately protected from the elements, pilferage, vandals or other damage. Requests for Payment which are incorrect, incomplete or are based on anticipated progress and deliveries will be rejected.

9.3.4 For payments that are to be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the University to establish the University's title to such materials or equipment or otherwise protect the University's interest, including applicable insurance. No payment will be made for materials until a bona fide and substantial on-site start has actually been made.

9.3.5 Where there is limited storage area on the site of the Work of this Contract, and it will improve the schedule or benefit the progress of the Work, the University will consider making payment for certain materials and equipment which are stored off the site. The University shall be the sole judge as to the types of materials and equipment it will pay for while in off-site storage and the conditions for the payment. The University will not pay for items in off-site storage which are: (1) damaged or otherwise defective; (2) off-the-shelf type materials; (3) held at the producer's plant; (4) produced over a period of time and normally would be installed to a schedule over a period of time as they are delivered, unless the University has caused a significant change in the schedule. For consideration of payment for items stored off-site, at the start of the Work the Contractor shall submit a proposed list to the University for review and concurrence, provide the reasons for each, the proposed storage locations and the anticipated delivery time. The list shall include: (1) the item; (2) proposed storage location; (3) anticipated delivery time to the off-site storage. To qualify for consideration, the material or equipment shall be:



- .1 A major item.
- .2 Specially fabricated or produced for the Work of this Contract and shall be in accordance with the Contract Documents; or
- .3 A critical material which is in short supply or which has an uncertain long lead time delivery schedule.
- .4 Properly stored and protected as approved by the University, including marking with the Project name.
- .5 Paid for in full by the Contractor (or by the Subcontractor purchasing the item) with the evidence of a paid receipt submitted with the Request for Payment. The Contractor (or Subcontractor) shall also certify the item is in storage and will be immediately available when required.
- .6 Examined by the University at the place of storage.
- .7 Properly insured, with insurance coverage (as a minimum) equal to the Property Insurance for the Project, as specified under Paragraph 11.2, and insurance evidence provided to the University. The Contractor shall also provide a Consent of the Surety to allowing payment for the item.
- .8 Furnished at no additional cost or expense to the University except the time required to examine the items.

9.3.6 The Contractor warrants and guarantees that title to all Work, materials and equipment covered by a Request for Payment, whether incorporated in the Project or not, will pass to the Owner upon the receipt of such payment by the Contractor, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials, or equipment covered by a Request for Payment will have been acquired by the Contractor, or by any other person performing the work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the Seller or otherwise imposed by the Contractor or such other person.

9.3.7 Unless otherwise specified in the Contract Documents, progress payments will be made for ninety percent (90%) of the value of the Work satisfactorily executed, or for materials and equipment furnished, installed or suitably stored in an approved manner, including all additions or deductions to the Contract Sum approved by Change Order, and less any previous payments made to Contractor or payments made for his account. No payment for engineering, shop drawings or other similar costs will be made until materials are delivered and satisfactorily stored or incorporated in the Work.

9.3.8 By submitting any Request for Payment the Contractor attests to the accuracy of the amounts requested, represents that the Work has been satisfactorily executed in compliance with the Contract Documents and he is entitled to the amount shown. By submitting the second or any subsequent

Request for Payment, the Contractor attests that he has paid all just claims for labor, materials, equipment, subcontracts or other expenses represented by all previous Requests for Payment.

9.3.9 No progress payment, nor partial or full use or occupancy of the Project, shall be construed as acceptance of any Work not in accordance with the Contract Documents. All Work is subject to an evaluation for conformance with the Contract Documents upon Completion, to the results of any subsequent tests required by the Contract Documents, to minor deviations from the Contract Documents correctable prior to Completion, and to any specific qualifications stated by the University or Architect. The making of a payment by the University shall not thereby be deemed to represent that it has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that it has reviewed the construction means, methods, techniques, sequences or procedures, or that it has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

9.3.10 Full or partial payment on the Contract Sum, or in reducing the retained amount (percentage) shall not relieve the Contractor or his Surety from fulfilling all obligations of this Contract, including guarantee of the Work. Under the conditions of the Contract, the Contractor and his Surety agree that they waive any actual or alleged rights of subrogation or action against the University and Architect as a result of such payments being made. The Surety at any time may examine the status of the Work, as well as any payments and may request the University withhold additional sums as they consider appropriate to protect their interests.

9.3.11 In the event the University is unable to approve payment in the full amount requested, due to work not satisfactorily complete in the amount represented by the Request for Payment, it may revise the amount indicated as due, process for payment and advise the Contractor of the change.

9.3.12 At the time any request is made to make full payment on a periodic Request for Payment or to reduce the retained percentage, the Contractor shall submit a written "Consent of Surety" to said reduction, without invalidating any obligation under the Bond.

#### 9.4 Payments Withheld

9.4.1 The University may decline to approve a Request for Payment in whole or in part, to the extent necessary to reasonably protect its interests. The University may also decline to approve any Request for Payment or, because of subsequently discovered evidence or subsequent inspections, it may nullify the whole or any part of any Request for Payment previously issued, to such extent as may be necessary in its opinion to protect the University from loss because of:

- .1 Defective work not remedied,
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims,
- .3 failure of the Contractor to make payments properly to Sub-contractors for labor, materials or equipment,

- .4 reasonable doubt that the Work can be completed for the unpaid balance of the Contract Sum,
- .5 damage to another contractor,
- .6 reasonable indication that the Work will not be completed within the Contract Time, or
- .7 unsatisfactory prosecution of the Work by the Contractor.

9.5 Not Used

9.6 Substantial and Final Completion

9.6.1 As applicable to the Work of this Contract, Substantial and Final Completion shall be as defined under Subparagraph 7.12.5 and 7.12.6.

9.6.2 When the Contractor determines that the entire Work, or a specified or designated area or part thereof as established by the University, is Substantially Complete, the Contractor shall submit to the University and Architect a written statement that the Work meets the requirements for Substantial Completion. At the same time, the Contractor shall submit to the University and the Architect a list of all items and Work to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Based on observations at the site, if the University agrees to the status of the Work, it will schedule and make an inspection of the Work and provide the Contractor with a list of any additional items to be completed, replaced or corrected. If the Work is not Substantially Complete, in the University's opinion, the Contractor will be advised and a subsequent date set for the inspection. In the absence of any other date established by the University, the day on which the University completed its inspection of the Work, or part, and determined the Work, or part, as Substantially Complete, will be the Substantial Completion date.

9.6.3 When the entire Work, or specified or designated area or part thereof as established by the University, is determined as Substantially Complete, or upon the University's full occupancy of the entire Work or established area or part thereof, the Contractor and the University shall review and agree on necessary changes in responsibilities as may be provided in the Contract Documents which are related to the Work, such as insurance, cost of services and utilities, heating and air conditioning, maintenance and similar matters. In no case shall Substantial Completion or occupancy relieve the Contractor from his obligations under the Contract. Unless otherwise specified, the change in responsibilities shall be effective the day after the Work is determined as Substantially Complete, or if full occupancy occurs earlier, on the first day of full occupancy.

9.6.4 The Contractor shall recognize the need for proper procedures and diligence to complete the Work and shall continuously prosecute it to completion, including the period after Substantial Completion. The Contractor shall organize and methodically prosecute all phases of completing the Work according to a schedule acceptable to the University.

9.6.5 Upon receipt of written notice from the Contractor that the Work is complete, all corrections made, all reports and other data filed, all equipment and systems tested and there is no other unfinished Work, the University will make one final inspection on the items previously noted to be completed or remedied. Final payment will not be made until the University has been fully and properly instructed in use and operation of all of the Work, equipment and systems under the Contract and all manuals, bonds and similar items have been provided.

## 9.7 Final Payment

9.7.1 Final payment, including any retained amount on the Contract Sum, will not become due until the Contractor provides any submittals the University may require to substantiate the Contractor's right to payment, such as: (1) affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the University or his property might in any way be responsible, have been paid or otherwise satisfied; (2) consent of surety, if necessary to final payment and (3) other data establishing payment or satisfaction of all obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designed by the University. If any Subcontractor refuses to furnish a release or waiver as may be required by the University, the Contractor may furnish a bond satisfactory to the University to indemnify it against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the University all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.7.2 Prior to final payment, the Contractor shall file with the University the certificate, Form 134, "Affidavit for Obtaining Final Settlement of Contract with the State of Minnesota", showing he has complied with M.S.A. 290.92 requiring withholding of income tax on wages at the source.

9.7.3 If after Substantial Completion of the Work, Final Completion thereof is materially delayed through causes not under the control of the Contractor, or a very minor amount of the Work remains incomplete or uncorrected due to weather, unsuitable conditions for testing or other circumstances, and the Architect so confirms, the University may, without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. In such case, the University will retain at least 3 times the value of the incomplete or uncorrected parts of the Work. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims, nor termination of the Contract.

9.7.4 The making of final payment shall constitute a waiver of all claims by the University except those arising from:

- .1 Unsettled liens;
- .2 faulty, defective, missing, substandard or improperly installed work previously noted or appearing or found after Substantial Completion;

- .3 failure of any of the Work to comply with the requirements of the Contract Documents; or
- .4 terms of any standard of special guarantees required by the Contract Documents.

9.7.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled.

#### ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

##### 10.1 Safety Precautions and Programs

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. All of the Work shall be performed in a safe manner.

##### 10.2 Safety of Persons and Property

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

- .1 all employees on the Work and all other persons who may be affected thereby;
- .2 the public, including University staff and employees;
- .3 all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-Subcontractors;
- .4 materials, equipment, supplies or construction of other contractors; and
- .5 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other improvements and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall comply with all applicable codes, laws, ordinances, rules, regulations and lawful orders of any public authority, including the University's Environmental Health and Safety Division, having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

10.2.3 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents and

other safety or protection measures. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the University.

10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel. No explosives shall be used without the permission of the University.

10.2.5 The Contractor shall provide and maintain adequate fire extinguishers or other fire fighting systems or devices in and around the construction area, available to all workmen, but shall not use extinguishers that are to be installed in the Work.

10.2.6 The Contractor shall not load or permit any loading which will endanger the safety of or in any way damage the Project, the Work, or any existing or adjacent facilities.

10.2.7 All damages or loss to any property referred to in Clauses 10.2.1.3 through 10.2.1.5, caused in whole or in part by the Contractor, any Sub-contractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied and paid for by the Contractor, except damage or loss solely attributable to faulty Drawings or Specifications, or to the acts or omissions of the University, or Architect or anyone employed by either of them or for whose acts either of them may be liable, and not attributable to the fault, acts, operations, methods or negligence of the Contractor.

### 10.3 Emergencies

10.3.1 In any emergency at the site affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss and shall immediately notify the University. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the Work.

## ARTICLE II INSURANCE

### 11.1 Contractor's Liability Insurance

11.1.1 The Contractor shall purchase and maintain such insurance as will protect him from claims which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable; such insurance shall, as a minimum, cover:

- .1 claims under workmen's compensation, disability benefit and other similar employee benefit acts;

- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;
- .4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person; and
- .5 claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

11.1.2 The insurance required by Paragraph 11.1 shall be written for not less than the limits of liability specified in Subparagraph 11.1.10, other requirements of the Contract Documents, or required by law, whichever is greater. The Contractor is solely responsible to purchase and provide adequate and additional insurance for work under the Contract, subject to the specified minimum requirements. The insurance shall be written on a Combination Comprehensive Liability Form with Broad Form Property Damage coverage.

11.1.3 Unless otherwise specified in the Contract Documents, as a minimum the liability coverage shall include:

- .1 General Public Liability.
- .2 Workmen's Compensation, with All States or Universal endorsement.
- .3 Employee's Liability, with All States or Universal endorsement.
- .4 Premises and Operations.
- .5 Contractor's Protective Contingent Liability.
- .6 Elevators (if any under this Contract).
- .7 Personal Injury, Groups A, B, and C.
- .8 Explosion, Collapse and Underground Property (The University will consider the exclusion of one or more of these hazards only if the Contractor provides a sworn statement which certifies no work involving these hazards will be performed under the Contract by the Contractor, any Subcontractor or anyone employed by them.)
- .9 Contractual Liability.
- .10 Completed Operations, which shall be maintained a minimum of one year after final completion.
- .11 Automobile, including owned, non-owned and hired vehicle coverage.

11.1.4 The Contractor's Contractual Liability insurance shall cover the Contractor's obligations under Paragraph 4.18. Insurance for said agreement shall, as a minimum, provide limits as specified for any claim arising out of the hold harmless agreement and said limits shall not be reduced as the result of any claim made under the Public Liability Insurance.

11.1.5 If any insurance policy is written to cover more than one exposure, the minimum limit specified for each exposure shall be available for claims under each of the exposures.

11.1.6 The insurance companies for all policies shall waive the right to assert immunity of the University as a defense to any claim made, and endorsements to policies or the certificate shall indicate the waiver.

11.1.7 Within 14 days after receipt of the Notice to Proceed or Contract execution, whichever occurs first, and prior to commencing the Work at the site, the Contractor shall submit to the University three copies, with one copy to the Architect, of a certificate of Liability Insurance indicating all coverages. The certificates shall be one Minnesota CICC Form 701, latest edition.

11.1.8 The Contractor shall not allow insurance to be cancelled, lapse, change by decrease in limits or coverage during the life of the Contract, including guarantee periods. In event of any such change or termination, 15 days prior written notice shall be given the University, the Architect, and all insured parties. Certificates shall bear acknowledgement of the notice requirement.

11.1.9 The Contractor's Surety for the Bond specified under Paragraph 7.5 shall be held until all claims against the insurance (including claims under Paragraph 4.18) have been settled and suitable evidence of the settlement has been provided to the University.

11.1.10 Unless otherwise specified in the Contract Documents, the minimum limits for liability insurance shall be as follows, unless higher limits are required by law:

- .1 Workmen's Compensation: As required by law
- .2 Employee's Liability: \$100,000
- .3 Bodily Injury - For \$300,000 each person  
each of Public Liability \$500,000 each occurrence  
and Automobile \$500,000 aggregate
- .4 Property Damage - \$250,000 each occurrence  
Public Liability \$500,000 aggregate
- .5 Property Damage - \$100,000 each occurrence  
Automobile
- .6 Personal Injury \$300,000 each person  
\$500,000 each occurrence
- .7 Contractual Liability Same limits as .3 and .4 above



.8 Umbrella Excess Liability: If such policy is used to supplement the underlying limits, it shall be written for not less than \$1,000,000 and both the underlying policy and the umbrella policy shall provide for X-C-U coverage.

## 11.2 Property Insurance

11.2.1 Unless otherwise provided in the Contract Documents, the Contractor shall purchase and maintain Property Insurance in the amount of 100% of the insurable value of Work under the Contract plus 1/4 of 1% of the Contract Sum for architectural fees which may be required as a result of a loss. This insurance shall include the interests of, and name or designate as joint insureds, the University, the Architect, the Architect's Consultants, and all other agents, the Contractor, his Subcontractors and Sub-subcontractors on the Work and shall, as a minimum, insure against the perils of Fire, Extended Coverage, Vandalism, Malicious Mischief and Multiple Perils, and shall cover debris removal. (Builder's Risk with Multiple Peril Form, with coverage equal to an Inland Marine Form)

11.2.2 The Property Insurance shall be placed into effect and two copies of the policy provided to the University prior to starting any work at the site, the delivery of any materials to the site or exposure to any loss may occur. The policy shall provide that in the event of cancellation or expiration, a minimum of 15 days written notice shall be provided the University and the Architect. In addition to providing copies of the policy to the University, the Contractor shall submit one copy of the policy to the Architect.

11.2.3 Property Insurance shall be maintained by the Contractor until completion of the Work under the Contract, or full occupancy by the University, whichever occurs first, as determined by the University. Prior to termination of the insurance, at a time approved by the University, 15 days written notice of the proposed termination shall be provided to the University and Architect.

11.2.4 At the time the policy is issued, an endorsement shall be attached to the policy granting "permission for partial occupancy," to prevent the insurance from becoming invalid for partial occupancy by the University.

11.2.5 The University, the Architect, the Contractor, any other separate contractor on the Project performing work under these General Conditions, and all their Subcontractors, upon execution of construction agreements in connection with the Project automatically waive all rights, each against all others, for damages caused by fire or other perils to the extent covered by insurance under this Paragraph 11.2, except such rights as they may have to proceeds of such insurance held by the Trustee. Any policy issued with a clause negating this waiver shall have the clause voided by endorsement or the policy will be unacceptable. The Contractor shall arrange for, and require, similar waivers by Subcontractors and Sub-subcontractors in accordance with Clause 5.3.1.5., if necessary.

11.2.6 The Property Insurance policy may include a deductible amount as specified, but not to exceed \$1,000 per occurrence, which shall not apply to the coverages of fire, windstorm, hail, lightning, smoke, explosion,

riot, civil commotion, aircraft, vehicles or the upset, overturning or collision of a transporting conveyance. The Contractor shall be responsible for any damage to his Work not covered (including damage subject to the deductible) by the insurance and he may self-insure or obtain insurance to cover any losses, at his option.

11.2.7 Any other property not covered by insurance provided under this Paragraph 11.2 (such as Contractor's tools, machinery or equipment and property of similar nature not destined to become a part of the Project) shall be Contractor's responsibility and Contractor may self-insure or provide other insurance at his option.

11.2.8 Any insured loss is to be adjusted with the University and made payable to the Contractor as Trustee for the insureds, as their interests may appear. The Contractor as Trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five days after the occurrence of loss to the exercise of this power. If such an objection is made, settlement with the insurers shall be made by the Contractor, the University and a third insured selected by them.

11.2.9 If required in writing by any party in interest, the Contractor as Trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of his duties. He shall deposit in a separate account any money so received, and he shall distribute it in accordance with such agreement as the parties in interest may reach, or in accordance with an award by arbitration.

11.2.10 In the event of an insured loss, with University agreement, the Contractor shall immediately arrange with his insurance carrier to allow the Contractor to replace, repair, rebuild or remedy the loss so the work is accomplished as quickly as possible and to prevent (or minimize) any delay in job progress. Any claim for time extension as a result of a loss shall be approved by the University.

11.2.11 Upon termination of the Contractor's Property Insurance, the University hereby waives any claim against the Architect, Contractor and his Subcontractors and Sub-subcontractors for damage to its property from the perils covered under the terminated Contractor's Property Insurance which may occur during the completion of the Work and the guarantee period.

11.2.12 For work involving additions, remodeling or repair to existing property, the University hereby waives any claim for damage to his existing properties against the Architect, and any claim against the Contractor and his Subcontractors and Sub-subcontractors for damage to its existing properties from fire or other peril insured by the Contractor's property insurance or the cost of such damage which is in excess of the specified minimum limit for the Contractor's Public Liability Property Damage coverage.

### 11.3 Steam Boiler and Machinery Insurance

11.3.1 Should the Work under the Contract include such equipment as steam boilers, other pressure vessels, hot water boilers, fired storage water

heaters, fired coil water heaters and similar equipment or objects, the Contractor shall effect and maintain appropriate broad coverage steam boiler and machinery insurance as required by law or the Contract Documents. Such coverage shall, as a minimum insure against loss or damage, including death or bodily injury, from explosion, rupture or bursting of the equipment, piping and normally covered appurtenances.

11.3.2 The policy shall name, as insureds, the Contractor, the University, the Architect, other contractors for the Work, Subcontractors and Sub-subcontractors.

11.3.3 The insurance shall be placed into effect prior to the start up and testing of the equipment and have a policy period of at least one year but in any event shall be maintained until Final Completion of the Work.

11.3.4 The policy shall cover, as a minimum (1) loss to property of the insured, including extra costs of temporary repair, (2) death or bodily injury liability, including defense, settlement and supplementary payments, and (3) property damage liability including defense, settlement and supplementary payments.

11.3.5 Unless otherwise specified in the Contract Documents, the minimum limits shall be \$500,000 per occurrence.

#### 11.4 Loss of Use Insurance

11.4.1 The University at its option, may purchase and maintain such insurance as will insure it against loss of use of its property due to fire or other hazards, however caused, except delay caused by the Contractor.

#### 11.5 Other Insurance

11.5.1 If other insurance is required by the University or the Contractor to insure against particular hazards not specified under Article 11 or elsewhere in the Contract Documents, they shall effect and pay for such special coverage as they may individually require or wish to carry.

11.5.2 If construction or any of the Work entails special hazards, the Contractor shall provide a rider or riders to be attached to the appropriate policies specified to cover such special hazards.

11.5.3 If any government agency requires special coverage for work on or adjacent to public streets or property, the Contractor shall comply with and provide such insurance, endorsements or extensions as may be required by the agency.

### ARTICLE 12 CHANGES IN THE WORK

#### 12.1 Change Orders

12.1.1 The University, without invalidating the Contract, may order Changes in the Work consisting of additions, omissions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such Changes in the Work shall be authorized by Change Order, or other

established written procedures, and shall be executed under the applicable conditions of the Contract Documents. Such Changes in the Work may be made without notice to the Surety on the Bond given under the Contract. The University reserves the right to require additional security when additions are made if, in its judgment, such security is necessary to protect its interests.

12.1.2 A Change Order is a written order to the Contractor signed by the University, issued after the execution of the Contract, authorizing a Change in the Work or an adjustment in the Contract Sum or the Contract Time. A Change Order may also be signed by the Contractor if he agrees to the adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order.

12.1.3 The cost or credit to the University shall be determined in one of the following ways and, unless otherwise approved or directed by the University, in the precedence of the order listed:

- .1 By an accepted Unit Price proposed in the Contractor's original bid and incorporated in the Contract or a Unit Price comparable to unit costs in the Contractor's Schedule of Values.
- .2 By a lump sum cost acceptable to the University, based on the Contractor's detailed, itemized breakdown of the actual basic cost, with allowance for the Contractor's profit and overhead, as provided for under Subparagraph 12.1.5.
- .3 By mutually agreeable Unit Prices for the actual cost, with allowance for the Contractor's profit and overhead, computed in a similar manner as provided for in Subparagraph 12.1.5.
- .4 On the actual basic cost of the Change, as determined by payroll records and paid receipts, plus allowance for the Contractor's profit and overhead as provided for in Subparagraph 12.1.5, subject to a predetermined maximum amount.

12.1.4 The Contractor shall provide or perform additional work, make other Changes in the Work and comply with the provisions of a Change Order, the same as though the Changes had been a part of the original Contract Documents, when and as ordered in writing by the University.

12.1.5 Except for Unit Prices included in the Contract, and unless otherwise approved by the University, for proposed Changes in the Work the Contractor shall submit an itemized list of quantities with the applicable unit cost and extended price for each, in such form and detail as required by the University or Architect.

- .1 As a minimum the detailed breakdown shall include and indicate the items enumerated below. Items (a) and (b) constitute the cost of labor and items (a), (b), (c) and (d) constitute the actual "basic costs" referred to under this Article 12.

(a) Actual labor costs, itemized by each trade involved showing the hourly rates for each. Labor rates shall be the same for extra and credit computations.

(b) Burden on labor, which shall be the actual costs of mandatory fringe benefits, taxes on labor, workmen's compensation, insurance on labor as affected by payroll, unemployment taxes, including FICA and FUTA.

(c) Actual quantities of material and equipment, with their actual unit costs.

(d) The cost of subcontracted work, computed in the same way as provided for under this Subparagraph 12.1.5.

(e) Overhead, profit or commission.

(f) Applicable sales tax on materials.

- .2 The maximum that will be allowed for overhead, profit or commission shall be as follows, expressed as a percentage of the actual basic cost of the change. The percentages for profit, overhead and commission allowed by the University may be less, depending on the nature, extent or complexity of the change, where the percentage is not commensurate with the responsibility and administration involved (such as the Contractor merely processing a substantial Change Order to a Subcontractor) but in no event shall they exceed the following:

	<u>Overhead</u>	<u>Profit</u>	<u>Commission</u>
(a) To the Contractor and/or his Subcontractor for work performed with his own forces	10%	10%	---
(b) To the Contractor for work performed by other than his own forces	---	---	10%

- .3 The burden on labor may be indicated as a dollar/cents addition to the hourly rate or may be expressed as a percentage of the extended hourly rate costs. If required by the University or Architect, the Contractor shall provide a detailed breakdown to justify the labor burden. The University reserves the right to reject any labor burden which is inconsistent with other similar contractors.
- .4 Material costs shall be at the actual cost to the Contractor, or Subcontractor. Upon request, the Contractor (or Subcontractor) shall submit evidence to substantiate the costs. Materials shall be quoted at trade discount prices, with quantity discounts also applied where the quantities warrant. Cash or prompt payment discounts need not be credited. In any proposal with material credits, the credit shall be based on the actual Contract cost of the material (including trade and quantity discounts) less any charges actually incurred for handling or returning a material which has been delivered. No "cancellation" charge will be allowed when material has not been shipped.

- .5 The percentages allowed for overhead, profit or commission under Clause 12.1.5.2 shall be deemed to include: (1) field and office supervision and administration, including the field superintendent and administrative foremen; (2) general insurance, except that listed as the labor burden; (3) use of small tools; (4) shop burden; (5) equipment rental (other than required additional hoisting equipment or required excavating equipment necessary solely as a result of the Change); (6) engineering and estimating costs; (7) performance (guaranty) bond; (8) cost of safety measures (including those imposed by OSHA); (9) shipping, drayage and demurrage; (10) and all other costs except those enumerated under Clause 12.1.5.1.
- .6 Except for changes based on Unit Prices included in the Contract, cost changes shall be computed by determining the actual basic costs enumerated under Clause 12.1.5.1, to which the overhead may be added, then the profit figure may be added and finally adding the sales tax on materials.
- .7 Subcontractors shall compute their costs in the same way and are subject to the same maximum percentages for overhead and profit. To the Subcontractor's price, the Contractor may add up to 10% commission.
- .8 Not more than three percentages for overhead, profit and commission will be allowed. The mark-up on any part of the Work a Subcontractor subcontracts will be limited to one overhead figure and one profit figure, in addition to the Contractor's commission. The Subcontractor and Sub-subcontractor may divide the overhead and profit amount as they agree upon.
- .9 For Changes involving extra cost by a Subcontractor and the Contractor, the commission shall be applied directly to the Subcontractor's price, with the overhead and profit figure applied only to the Work the Contractor performs with his own forces.
- .10 For Changes involving both extra and credit amounts, the overhead and profit, or commission, shall be applied only to net difference where the extra exceeds the credit.
- .11 For Changes resulting in a credit in the basic costs, a reasonable allowance for overhead, profit or commission shall be credited the Owner, as determined by the University. In general no credit for overhead, profit or commission will be required where the net change credit is minor or where the Change in Work indicates it is reasonable for no credit be allowed to the University. In the event of substantial subcontract credits, or for Work performed by the Contractor, a reasonable overhead, profit or commission credit shall be allowed to the University, in an amount acceptable to the University.

12.1.6 On Changes where the value or extent of Work cannot be reasonably pre-determined or agreed upon, the University, at its sole discretion, may

authorize Work to proceed on an agreed upon cost plus basis, not to exceed a pre-determined maximum amount. In such cases, the basic costs and mark-up for overhead, profit and commission will be in accordance with this Paragraph 12.1.

12.1.7 Unit Prices proposed on the bid form and included in the Contract are not subject to further profit, overhead or commission adjustments, nor the conditions of Subparagraph 12.1.5. The Contract Sum will be adjusted by the direct extension of the number of units and the Unit Prices.

12.1.8 The University may, at its discretion, initiate procedures for Modifications for Changes in the Work involving the Contract Sum, prior to preparation of a formal Change Order. Such Modifications shall be signed by authorized representatives of the University, shall be subject to the same conditions and cost proposals as Change Orders, shall order and authorize the Contractor to proceed with the Changes in the Work and shall have the same effect as a Change Order, except the Contract Sum or Contract Time will not be changed until the Modification has been incorporated in a subsequent Change Order.

12.1.9 Except in an emergency endangering life or property, the Contractor shall make no Changes in the Work affecting the Contract Sum or Contract Time unless in pursuance of a Change Order or other written order from the University, or from the Architect and approved by the University, whereby the scope of the change and the cost, or basis of payment, is agreed upon.

12.1.10 Should Contractor find during progress of the work that, in his judgment, existing conditions or requirements make desirable, or beneficial, a Modification in the Contract requirements, he shall promptly report such matters to University and Architect, in writing, for decision and instruction.

12.1.11 If Unit Prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed that application of the agreed unit prices to the quantities of Work proposed will create a hardship on the University or the Contractor, the applicable unit prices shall be equitably adjusted to prevent such hardship.

12.1.12 Should concealed or subsurface conditions encountered in the performance of the Work be at significant variance with the conditions indicated by the Contract Documents, or in other information available to the Contractor including his own investigations, or should a significant variance from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, the University and the Architect shall be notified immediately before the conditions are disturbed. Upon the determination that a significant difference exists, such changes shall be made as determined to be necessary and the Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within fourteen days after the first observance of the conditions.

## 12.2 University's Right to Perform Changes in the Work

12.2.1 If the University does not accept proposals of the Contractor for additional Work or Changes in the Work and no agreement is reached, or if

it does not seem advisable or expedient to proceed on the basis of the Contractor's proposal, the University reserves the right to perform additional Work or Changes in the Work with its own personnel or to employ others for Changes in the Work.

### 12.3 Claims for Additional Cost

12.3.1 If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give the University and the Architect written notice thereof within fourteen days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor and approval to proceed issued prior to the Contractor proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Subparagraph 10.3.1. No such claim shall be valid unless so made. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

12.3.2 If the Contractor claims that additional cost is involved because of (1) any written interpretation issued pursuant to Subparagraph 1.2.5, (2) any written order for a minor change in the Work issued pursuant to Paragraph 12.4, the Contractor shall make such claim as provided in Subparagraph 12.3.1.

### 12.4 Minor Changes in the Work

12.4.1 The Architect and the University shall have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. The University and Architect also reserve right to make minor changes in dimensions, locations, arrangements, or details to accommodate changes in other materials and equipment, improve the Work or prevent unforeseen interference with structural or other features. Such changes shall be made without change in the Contract Sum.

## ARTICLE 13 - UNCOVERING AND CORRECTION OF WORK

### 13.1 Uncovering of Work

13.1.1 If any Work should be installed or covered contrary to the provisions of the Contract Documents or request of the University or Architect, it must, if required by the University or Architect, be removed or uncovered for observation and replaced at the Contractor's expense. The Contractor shall give timely notice to the University and Architect of the readiness of work for observation.

13.1.2 If any other Work has been covered which the Contract Documents, University or Architect has not specifically requested to observe prior to being covered, the University or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be paid by the University. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by a separate contractor employed as provided in Article 6, and in



that event the separate contractor shall be responsible for the payment of such costs.

### 13.2 Correction of Work

13.2.1 The Contractor, all Subcontractors, and Subsubcontractors shall be bound by the conditions of this Paragraph 13.2. The Contractor shall promptly correct all Work rejected by the Architect or the University as defective or as failing to conform to the Contract Documents whether observed before or after Completion and whether or not fabricated, installed or completed, unless the University elects to accept the Work as provided for under 13.3. The Contractor shall bear all costs of correcting such rejected Work, including the cost of the Architect's additional services thereby made necessary. Work rejected before Final Completion shall be corrected prior to final payment.

13.2.2 If, within one year after date of Substantial Completion, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the University to do so unless the University has previously given the Contractor a written acceptance of such condition. The University shall give such notice promptly after discovery of the condition.

13.2.3 Except as provided under Subparagraph 13.2.5 the commencement of the specified guaranty or correction of Work periods covered by this Article, or any other special specified period, shall be the date of the inspection for Substantial Completion of the last unit, part or phase of the Work, except for any work then noted as incomplete or unsatisfactory. The guarantee period for said incomplete or unsatisfactory work shall start on the date of final correction or remedy and the acceptance of these features by the University. In the absence of specifically noted dates of inspection for Substantial Completion (or of acceptance, in writing, by the University of corrected work), the date of the final payment on the entire Contract will be the start of the guarantee period. Occupancy or use of the Work shall not be construed as commencing guarantee periods at any earlier date.

13.2.4 The specified correction of Work or general guarantee periods, or other special guarantees specified for other periods of time, or by law, shall not be limited by any warranty of a manufacturer, producer, supplier or Subcontractor or other source. The specified guarantees shall be provided by the Contractor, who shall make his own arrangements with the manufacturer, producer, supplier, Subcontractor or other source as he may choose. Where a manufacturer, producer, supplier or Subcontractor guarantees or provides warranties in excess of the general guarantees, the extended guarantees and warranties shall be passed to the University, the same as though they were specified under this Article 13.

13.2.5 Should special circumstances indicate an earlier commencement of guarantee or correction of Work periods than on Substantial Completion is reasonable for certain parts of the Work, in the opinion of the Architect or University, the University may consider such earlier start provided suitable credit is given the University. An earlier start of the periods

shall be only with the University's written approval of the time and acceptance of the credit by Change Order.

13.2.6 The expiration of any guarantee or correction of Work period shall not relieve the Contractor of the obligation to correct, at his own expense, any latent defect in the Work or deficiencies which are not readily ascertained, including but not limited to defective materials and workmanship, defects attributable to substitutions for specified materials, substandard performance or any of the Work otherwise not in compliance with the Contract Documents. Such latent defects or deficiencies shall be corrected as provided in this Paragraph 13.2. Following the correction or replacement of any of the Work, as above specified, the Contractor shall correct any defects or deficiencies in the corrected or replaced materials and workmanship, which is found within one year after the date of correction or replacement.

13.2.7 All such defective or non-conforming Work under Subparagraphs 13.2.1 and 13.2.2 shall be removed from the site if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the University or Architect.

13.2.8 The Contractor shall bear the cost of making good all work of separate contractors destroyed or damaged by such removal or correction.

13.2.9 If the Contractor does not remove such defective or non-conforming Work within a reasonable time fixed by written notice from the University or the Architect, the University may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the University may upon ten additional days' written notice sell such Work at auction or at a private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for additional architectural services. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the University.

13.2.10 If the Contractor fails to correct such defective or non-conforming Work, the University may correct it in accordance with Paragraph 3.5.

### 13.3 Acceptance of Defective or Non-Conforming Work

13.3.1 If, in the opinion of the University, it is expedient, or in its best interest, or should the University choose to accept defective or non-conforming Work for convenience, it may do so instead of requiring the removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the Contract Sum for the difference in value together with an allowance for damage or loss of quality. If the amount is determined after final payment, it shall be paid by the Contractor or his Surety. The amount shall be determined by the University.

## ARTICLE 14 TERMINATION OF THE CONTRACT

### 14.1 Termination by the Contractor

14.1.1 If the Work is stopped for a period of thirty days under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, or if the Work should be stopped for a period of thirty days by the Contractor for University's failure to make payment within 30 days after payment is due then the Contractor may, upon ten days' written notice to the University and the Architect, terminate the Contract and recover from the University payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit. Such right to termination, however, shall not extend to material shortages as a result of market conditions, diminishing resources or other causes except a formally declared emergency specifically restricting or preventing the use of materials.

### 14.2 Termination by the University

14.2.1 If the Contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials to satisfactorily prosecute and complete the Work according to schedule and within the Contract Time, or if he fails to make prompt payment to Subcontractors or for materials or labor, or disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the University, with the advice of the Architect, may, without prejudice to any right or remedy and after giving the Contractor and his Surety seven days' written notice, require the Surety to promptly take over and complete the Work under the terms of the Contract. Should the Surety fail to assume the obligations of completing the Work within ten days after receipt of the written notice, the University may, upon seven days' additional notice, terminate the Contract (except the obligations under the Bond) and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method it may deem expedient. In such case the Contractor or his Surety shall not be entitled to receive any further payment until the Work is finished.

14.2.2 If the University completes the Work and the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including the University's additional costs, attorneys' costs and compensation for the Architect's additional services, an amount shall be paid to the Contractor only to the extent as will compensate him for the Work the Contractor actually performed, based on the actual basic costs as defined under Clause 12.1.5.1. If such cost for the University to complete the Work exceeds such unpaid balance, the Contractor or his Surety shall pay the

difference to the University. The costs incurred by the University as herein provided shall be certified by the University.

ARTICLE 15 - EQUAL EMPLOYMENT OPPORTUNITY

15.1 Non-Discrimination, Equal Employment Opportunity

15.1.1 Unless other Equal Employment Opportunity provisions are included in the Contract Documents, the Contractor shall comply with the University of Minnesota Construction Contract Non-Discrimination requirements of Subparagraphs 15.1.2 through 15.1.12 throughout the life of the Contract.

15.1.2 The Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, or sex. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, national origin, or sex. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

15.1.3 The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the University of Minnesota setting forth the provisions of this non-discrimination clause.

15.1.4 The Contractor shall designate an Equal Employment Opportunity Officer, who shall have authority and responsibility for the implementation of equal employment opportunity and affirmative action programs under this Contract. The Contractor shall submit for approval a written copy of its program within fifteen (15) days after receipt of notice from the University of Minnesota.

15.1.5 The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, national origin, or sex.

15.1.6 The Contractor shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other contracts or understanding, a notice to be provided by the University of Minnesota advising the labor union or workers' representatives of the Contractor's commitments under this policy and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

15.1.7 The Contractor shall be required to give evidence of persistent and prolonged efforts to increase the number of minority group employees. The Contractor shall make maximum use of apprentices to develop qualified minority personnel. The Contractor shall seek to fill labor shortages for apprentices and skilled journeymen by upgrading present employees including qualified minority employees.

15.1.8 The Contractor shall furnish to the University of Minnesota information and periodic reports necessary to substantiate his compliance with the requirements of this policy during the duration of the Contract. These reports shall include an appraisal of the effectiveness of the Contractor's equal employment opportunity and affirmative action programs, and shall list any factors and conditions which impede, restrict, or account for less than complete success of the program. The Contractor shall permit access to his books, records, and accounts by the University of Minnesota for purposes of investigation to ascertain compliance with these provisions.

15.1.9 Non-compliance with any requirements of these provisions shall be a breach of a condition of the Contract and will afford the University any and all rights otherwise described under the terms of the contract as applying to the breach of condition.

15.1.10 The Contractor shall include the provisions of Subparagraphs 15.1.2 through 15.1.10 in every subcontract, unless exempted by the provisions of this policy, so that provisions will be binding on each Subcontractor. The Contractor shall take such action as may be required to enforce such provisions.

15.1.11 Contracts and subcontracts not exceeding \$10,000 are exempt from the reporting requirements of this Article.

15.1.12 Except in the case of subcontracts for the performance of construction work at the site of construction, provisions of Subparagraphs 15.1.2 through 15.1.10 shall not be required to be inserted in subcontracts below the second tier.

## ARTICLE 16 - WAGE RATES

### 16.1 Minimum Wage Rates

16.1.1 Unless other Wage Rates are included in the Contract Documents, the Contractor shall comply with the provisions of Subparagraph 16.1.2. If other Wage Rates are included in the Contract Documents, such other rates that are higher than required under Subparagraph 16.1.2 shall be paid by the Contractor for labor on the Work.

16.1.2 For any Contract for construction, alteration, or repair of University buildings or other major structures, financed in whole or in part by State appropriation and which exceeds \$2,500 in total cost, the Contractor and his Subcontractors shall pay to their respective laborers and mechanics employed directly on the Work at the site at least the wage rate then prevailing in the area of the Project. The term "prevailing wage rate" shall mean the wage paid to the largest number of those employed in the same class of labor in the labor market area, as determined by the University.

16.1.3 By requiring the Contractor to pay the wages under Subparagraph 16.1.2, or to pay any other minimum wage rates, neither the University nor the Architect represent that labor may be employed at the minimum hourly wage called for. The Contractor shall investigate and verify the conditions at the location of the Work, to satisfy himself as to the availability and cost of labor required to perform the Work.

16.1.4 The Contractor shall examine any wage rate schedule included in the Contract Documents for completeness or accuracy. Should any trade which will be used for the Work be omitted, or any wage rate shown be incorrect from prevailing wages of the area, such omission and discrepancies shall be reported to the University for determination. If necessary, the Contractor shall assist in obtaining decisions on incorrect or missing rates.

## ARTICLE 17 - DHEW REQUIREMENTS FOR FEDERALLY ASSISTED CONSTRUCTION CONTRACTS

### 17.1 Equal Opportunity

17.1.1 During the performance of this contract the Contractor agrees as follows:

- .1 The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by an appropriate agency of the Federal Government setting forth the requirements of these non-discrimination provisions.
- .2 The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.
- .3 The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding a notice to be provided advising the labor union or workers' representative of the Contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- .4 The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965 and of the rules, regulations and relevant orders of the Secretary of Labor.
- .5 The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records,

and accounts by an appropriate agency of the Federal Government and by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

- .6 In the event of the contractor's noncompliance with the equal opportunity conditions of this contract or with any of such rules, regulations or orders, this contract may be cancelled, terminated or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, or Federally Assisted Contracts, in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in said Executive Order, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.
- .7 The Contractor will include all of clauses of 17.1.1.1 through 17.1.1.7 inclusive in every subcontract or purchase order, unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontractor or vendor as the appropriate agency of the Federal Government may direct as a means of enforcing such provisions, including sanctions for noncompliance: provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the appropriate agency of the Federal Government, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

17.1.2 Exemptions to the requirements of the above Equal Opportunity conditions are contracts and subcontracts not exceeding \$10,000, and contracts and subcontracts with regard to work performed outside the United States by employees who were not recruited in the United States.

17.1.3 Unless otherwise provided, the above Equal Opportunity provisions are not required to be inserted in subcontracts except for subcontracts involving the performance of construction work at the site of construction, in which case the provisions must be inserted in all such subcontracts.

## 17.2 Prevailing Wages

17.2.1 All mechanics and laborers employed or working directly upon the site of the work shall be paid unconditionally, and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Copeland Regulations [29 Code of Federal Regulations, Part 3]), the full amounts due at time of payment computed at wage rates not less than the aggregate of the basic hourly rates and the rates of payments, contributions, or costs for any fringe benefits contained in the wage determination decision of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor or Subcontractor and such laborers and mechanics, and the

wage determination decision shall be posted by the Contractor at the site of the work in a prominent place where it can easily be seen by the workers.

17.2.2 The Contractor may discharge his obligation under subparagraph 17.2.1 to workers in any classification for which the wage determination decision contains:

- .1 Only a basic hourly rate of pay, by making payment not less than such basic hourly rate, except as otherwise provided in the Copeland Regulations (29 CFR, Part 3); or
- .2 Both a basic hourly rate of pay and fringe benefit payments, by making payment in cash, by irrevocably making contributions pursuant to a fund, plan or program for and/or by assuming an enforceable commitment to bear the cost of bona fide fringe benefits contemplated by the Davis-Bacon Act, or by any combination thereof. These fringe benefit payments can be discharged only by making contributions to the same type or types of fringe benefits listed in the applicable determination. Contributions made, or costs assumed, on other than a weekly basis shall be considered as having been constructively made or assumed during a weekly period to the extent that they apply to such period. Where a fringe benefit is expressed in a wage determination in any manner other than as an hourly rate and the contractor pays a cash equivalent or provided an alternative fringe benefit, he shall furnish information with his payrolls showing how he determined that the cost incurred to make the cash payment or to provide the alternative fringe benefit is equal to the cost of the wage determination fringe benefit. In the event of disagreement between or among the interested parties as to an equivalent of any fringe benefit, the owner shall submit the question together with his recommendation through the appropriate Federal agency to the Secretary of Labor for final determination.

17.2.3 The assumption of an enforceable commitment to bear the cost of fringe benefits listed in the wage determination decision forming a part of the contract may be considered as payment of wages only with the approval of the Secretary of Labor pursuant to a written request by the Contractor. The Secretary of Labor may require the Contractor to set aside assets, in a separate account, to meet his obligations under any unfunded plan or program.

17.2.4 The owner shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified or reclassified conformably to the wage determination and a report of the action taken shall be sent to the appropriate Federal agency. If the interested parties cannot agree on the proper classification or reclassification of a particular class of laborers or mechanics to be used, the owner shall submit the question together with his recommendations through the appropriate Federal agency to the Secretary of Labor for final determination.

17.2.5 In the event it is found by the owner that any laborer or mechanic employed by the Contractor or any Subcontractor directly on the site of the work has been or is being paid at a rate of wages less than the rate



of wages required by subparagraph 17.2.1, the owner may (a) by written notice to the prime contractor terminate his right to proceed with the work, or such part of the work as to which there has been a failure to pay said required wages, and (b) prosecute the work to completion by contract or otherwise, whereupon such Contractor and his sureties shall be liable to the owner for any excess costs occasioned the owner thereby.

### 17.3 Contract Work Hours and Safety Standards Act - Overtime Compensation (40 United States Code 327-330)

17.3.1 The Contractor shall not require or permit any laborer or mechanic in any work-week in which he is employed on any work under this contract to work in excess of 8 hours in any calendar day or in excess of 40 hours in such work-week on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all such hours worked in excess of 8 hours in any calendar day or in excess of 40 hours in such work-week, whichever is the greater number of overtime hours. The "basic rate of pay" as used in this provision shall be the amount paid per hour, exclusive of the Contractor's contribution or cost for fringe benefits, and any cash payment made in lieu of providing fringe benefits, or the basic hourly rate contained in the wage determination, whichever is greater.

17.3.2 In the event of any violation of the provisions of subparagraph 17.3.1, the Contractor shall be liable to any affected employee for any amounts due and to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions of subparagraph 17.3.1, in the sum of \$10 for each calendar day on which such employee was required or permitted to be employed on such work in excess of 8 hours or in excess of the standard work-week of 40 hours without payment of the overtime wages required by subparagraph 17.3.1.

17.3.3 The Contractor shall not require or permit any laborer or mechanic employed in the performance of this contract to work in surroundings or under conditions which are unsanitary, hazardous, or dangerous to his health as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation (29 CFR Part 1518, 36 F.R. 7340, April 17, 1971) pursuant to Section 107 of the Contract Work Hours and Safety Standards Act.

### 17.4 Apprentices

17.4.1 Apprentices shall be permitted to work as such only when they are registered individually under a bona fide apprenticeship program registered with a State apprenticeship agency which is recognized by the Bureau of Apprenticeship and Training, U. S. Department of Labor or, if no such recognized agency exists in a State, under a program registered with the aforesaid Bureau of Apprenticeship and Training. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio permitted to the Contractor as to his entire work force under the registered program. Any employee listed on a payroll at any apprentice wage rate, who is not registered as above, shall be paid the wage rate determined by the Secretary of Labor for the classification of work he actually performed.

17.4.2 The Contractor shall furnish written evidence of the registration of his program and apprentices, the ratios allowed and the wage rates required to be paid thereunder for the area of construction prior to using any apprentice in the contract work.

#### 17.5 Payrolls and Basic Records

17.5.1 The Contractor shall maintain payrolls and basic records relating thereto during the course of the work and shall preserve for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name and address of each employee, his correct classification, rate of pay (including rates of contributions for, or costs assumed to provide, fringe benefits), daily and weekly number of hours worked, deductions, made and actual wages paid. Whenever the Contractor has obtained approval from the Secretary of Labor as provided in subparagraph 17.2.3, he shall maintain records which show the commitment, its approval, written communication of the plan or program to the laborers or mechanics affected, and the costs anticipated or incurred under the plan or program.

17.5.2 The Contractor shall submit weekly a copy of all payrolls to the Owner. The Prime Contractor shall be responsible for the submission of copies of payrolls of all subcontractors. Each such copy shall be accompanied by a statement signed by the Contractor indicating that the payrolls are correct and complete, that the wage rates contained therein are not less than those determined by the Secretary of Labor, and that the classifications set forth for each laborer or mechanic conform with the work he performed. Submission of the "Weekly Statement of Compliance" required under this contract and the Copeland Regulations of the Secretary of Labor (29 CFR, Part 3) shall satisfy the requirement for submission of the above statement. The Contractor shall submit also a copy of any approval by the Secretary of Labor with respect to fringe benefits

17.5.3 The Contractor shall make the records required under subparagraphs 17.5.1 and 17.5.2 available for inspection by authorized representatives of the owner, the State, the appropriate Federal agency and the U. S. Department of Labor, and shall permit such representatives to interview employees during working hours on the job.

#### 17.6 Compliance With Copeland Regulations

17.6.1 The Contractor shall comply with the Copeland Regulations of the Secretary of Labor (29 CFR, Part 3) which are incorporated herein by reference. In addition, the Weekly Statement of Compliance required by these regulations shall also contain a statement that the fringe benefits paid are equal to or greater than those set forth in the minimum wage decision.

#### 17.7 Withholding of Funds

17.7.1 The Owner may withhold or cause to be withheld from the Prime Contractor so much of the accrued payments or advances as may be considered necessary (a) to pay the laborers and mechanics employed by the Contractor or any Subcontractor on the work the full amount of wages required by the contract, and (b) to satisfy any liability of any Contractor for liquidated damages under paragraph 17.3 hereof entitled "Contract Work Hours and Safety Standards Act - Overtime Compensation (40 USC 327-330)".

17.7.2 If the Contractor or any Subcontractor fails to pay any laborer or mechanic employed or working on the site of the work, all or part of the wages required by the Contract, the owner may, after written notice to the Prime Contractor, take such action as may be necessary to cause suspension of any further payments or advances until such violations have ceased.

#### 17.8 Subcontracts

17.8.1 The Contractor will insert in all subcontracts paragraph 17.2 through 17.9 inclusive, respectively entitled "Prevailing Wages", "Contract Work Hours and Safety Standards Act - Overtime Compensation (40 USC 327-330)", "Apprentices", "Payrolls and Basic Records", "Compliance with Copeland Regulations", "Withholding of Funds", "Subcontracts" and "Contract Termination - Debarment", and shall further require all subcontractors to incorporate physically these same paragraphs in all subcontracts.

17.8.2 The term "Contractor" as used in such paragraphs in any subcontract shall be deemed to refer to the subcontractor except when the phrase "Prime Contractor" is used.

#### 17.9 Contract Termination - Debarment

17.9.1 A breach of paragraphs 17.2 through 17.8 inclusive, respectively entitled "Prevailing Wages", "Contract Work Hours and Safety Standards Act - Overtime Compensation (40 USC 327-330)", "Apprentices" "Payrolls and Basic Records", "Compliance with Copeland Regulations", "Withholding of Funds" and "Subcontracts", may be grounds for termination of the contract and for debarment as provided in 29 CFR 5.6.

#### 17.10 Certification of Nonsegregated Facilities

(Applicable to contracts and subcontracts exceeding \$10,000 which are not exempt from the provisions of Paragraph 17.1 "Equal Opportunity" of this Article.)

17.10.1 By entering an agreement related to the work described in the Contract Documents the Contractor or Subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The Contractor and Subcontractor further certifies that he will not maintain or provide for his employees any segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The Contractor or Subcontractor agrees that a breach of this certification is a violation of paragraph 17.1 "Equal Opportunity". As used herein, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities, provided for employees on the basis of race, creed, color, or national origin, because of habit, local custom or otherwise. The Contractor further agrees that (except where he has obtained identical certifications from proposed subcontractors

for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from this provisions of paragraph 17.1 "Equal Opportunity"; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

"NOTICE TO PROSPECTIVE SUBCONTRACTORS  
OF REQUIREMENT FOR CERTIFICATIONS OF  
NONSEGREGATED FACILITIES"

A certification of nonsegregated facilities, as required by the May 9, 1967, order (32 Federal Register 7439, May 19, 1967) on elimination of segregated facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of paragraph 17.1 "Equal Opportunity". This certification may be submitted either for each subcontract or for all subcontracts during a period, i.e. quarterly, semi-annually or annually.

17.10.2 The penalty for making false statements in certifications required by subparagraph 17.10.1 is prescribed in 18 USC 1001.

17.11 Disqualified Subcontractors

17.11.1 The Contractor may utilize the services of only those Subcontractors who have not been disqualified under existing Federal laws and regulations from participating in Federally assisted construction projects.

17.12 Federal Inspection

17.12.1 The authorized representatives and agents of the Federal Government shall be permitted to inspect all Work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

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1.1 DIVISION ONE

A. The requirements of all Sections of Division I apply to and shall govern each Contractor and all Subcontractors for this Project. Where provisions and requirements are referred to as the responsibility of a particular Contractor, or a Subcontractor, he shall have the primary responsibility to accomplish, provide, assume, and enforce, but all Contractors and all Subcontractors shall be governed by the requirements and cooperate fully in fulfilling the requirements.

1.2 GENERAL SUMMARY OF WORK

A. Location: The project site is located on the Minneapolis Campus of the University of Minnesota adjacent to the existing Jackson Owre Millard Lyon Complex.

B. General Summary: The work under this contract consists of furnishing and installing of all labor, equipment, materials, and incidentals necessary to the completion of University of Minnesota Jackson Owre Millard Lyon Complex Remodeling - Contract A (JOML-A), consisting primarily of the construction of two towers for mechanical duct work and equipment, one at the south wall of Millard Hall (Southeast Tower) and one at the South wall of Jackson-Owre Hall (Southwest Tower).

C. Other Contracts: A separate other contract with Sheehy Construction Company has been awarded for the construction of Unit B/C of the University's Health Sciences Expansion with work involving a portion of the site of the Southeast Tower of this JOML-A Project.

D. Work related to other contracts: The work of this JOML-A Contract shall be carefully coordinated with the work of the Unit B/C Contract.

E. Future contracts: The University will award future contracts for other remodeling projects in the Jackson Owre Millard Lyon Complex, and reserves the right to demand the cooperation of this JOML-A Contractor with all others on and about the JOML Complex.

1.3 SCOPE OF WORK

A. The work of this Contract includes the complete construction of the JOML-A Project under a single lump sum Contract.

B. The Contractor shall cooperate and coordinate all of his work with the work of the Unit B/C Contractor, and with the University and all other contractors, and shall schedule all of his Work with the other contractors and the University.

C. Singular notations and specifications shall be considered plural where plural application is reasonably inferrable. Mention or indication of extent of work under any work Division of specification Section is done only for the convenience of Contractor and shall not be construed as describing all work required under that Division or Section.

D. The Contractor shall provide a competent supervisor or foreman at the site, as well as qualified workmen, to coordinate with the other contractors and to supervise all installations. If the Contractor does not regularly employ certain required skilled tradesmen required for the installations, he shall employ them, or subcontract the work.

E. The entire installation shall comply with all codes and regulations, including the State of Minnesota and the University.

F. Except where reusing of existing materials or equipment is required by the Contract Documents, all equipment and material shall be new, undamaged, in proper operating condition, serviced and ready for full use of the University after installation.

#### 1.4 LIST OF DRAWINGS

A. The drawings applicable to the Work of this Contract are entitled Jackson Owre Millard Lyon Complex Remodeling-Contract A, dated July 20, 1976 and enumerated on drawing number A-1.

#### 1.5 ADDITIONAL DEFINITIONS

A. Owner: Where used, the term is synonymous with the University.

B. Site: In general, the term refers to the actual site within the construction limits indicated, adjacent areas outside the construction limits where work must be performed to complete the Contract and nearby adjacent areas indicated as staging/storage areas and the access to these areas.

#### 1.6 PRECONSTRUCTION CONFERENCE AND SITE MEETINGS

A. After award of contracts, at time designated by the University, the Contractor and key sub-contractors shall attend a Pre-construction Conference at a location in the Metropolitan Twin City area. Government requirements, procedures to be followed, coordination efforts and similar matters will be reviewed.

B. During construction, periodic site meetings will be held under the supervision of the University at times directed by the University. These meetings will be held weekly (unless job conditions do not warrant) and may be held more frequently if job progress and needs indicate. Except when excused as being not necessary due to the status of work, Contractor and all key sub-contractors shall have one or more responsible representatives in attendance. The General Contractor shall be responsible for recording "minutes" of the meeting and distributing them to all interested parties.

#### 1.7 START AND COMPLETION

A. The date on the Owner's written notice to proceed or letter of intent shall be the official starting date of the Project, which shall also be the date of the Contract.

B. It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that each date of commencement of work, Substantial Completion

and Final Completion as specified in Section 01200 is an Essential Condition of this Contract.

C. The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure Substantial and Final Completion within the times specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for the completion of the work described herein is a reasonable time for the work. In submitting a proposal, and in accepting a Contract, the Contractor (and subcontractors) are representing and indicating they have analyzed the Project, the materials and methods involved, availability of qualified mechanics and unskilled labor, time of year, their own work load and capacity to perform the Work and are indicating their agreement that the specified completion times are reasonable for the Work to be done, considering Project conditions, materials and equipment involved, usual industrial conditions, climatic conditions prevailing in the locality of the Project, and other factors, with reasonable allowance for variations from typical or ideal conditions.

#### 1.8 COORDINATION, DIMENSIONS AND WORK AREAS

A. It is imperative and mandatory to schedule and coordinate all activities with the Unit B/C and other contractors, all sub-contractors and the University.

B. Should field dimensions be required, the Contractor and sub-contractors shall cooperate to obtain or provide them. Each Contractor shall cooperate in obtaining dimensions to prevent fabrication delay. In the event it is impractical to have work in place to permit field dimensions, the Contractor shall guarantee necessary dimensions, to the various fabricators and be responsible to insure the dimensions.

C. Storage areas and work spaces at the project site are very limited. The Contractor shall utilize offsite storage until deliveries can be made directly to the proper locations, for installation immediately after delivery. The Contractor shall alert and advise subcontractors and suppliers of the need to hold deliveries until they are notified the materials are required.

1. Refer to drawings for limitations of construction site relating to storage.

D. The only access to the South East Tower site is through the existing B/C construction site or by temporary access road into Mayo Court. Contractor shall be responsible for scheduling his work in coordination and cooperation with the Unit B/C Contractor so as to obtain proper access for deliveries and erection without interfering with Unit B/C work or in any way obstructing traffic on access roads to the hospital.

E. All work in the Mayo Court area shall be completed prior to June 1, 1977.

F. The Contractor shall confine his unloading and storage at the site to areas as directed by the University. In general, assembly and similar installation activities shall be confined to the particular location or space for the installation, unless specifically approved by the University.

G. The Contractor shall cooperate with other contractors, with due respect for the methods and schedules of the others, and shall work in close coordinated effort to the benefit of the completion of the Project and so as not to delay or impede the work of other contractors. In the event of conflict or need to establish priority, the University shall make the determination of the precedence or other required decision to the benefit of the overall Project and its progress, which shall be binding on all contractors.

H. With respect to mechanical and electrical features of equipment, complete data must be exchanged directly between Contractors as the progress of the Project requires. The person requesting the information shall advise when it will be required.

I. All work shall be accomplished to cause a minimum of disruption of the University's activities, uses, functions and programs in/and around the building, as approved by the University.

#### 1.9 PERMITS AND FEES

A. Refer to Paragraph 4.7 of the General Conditions. The University will obtain and pay for all permits and connection charges of the State, City of Minneapolis and utility companies, at no cost to the Contractors, except as noted in C. following.

B. The University will pay all fees to the State, as may be required for review and inspection services.

C. The Contractors shall make their own arrangements, and pay any charges including parking costs and bonds, for use of public streets or roads in transporting, loading/unloading or use of construction equipment on the streets.

#### 1.10 USE OF ELEVATORS

A. No use of elevators will be allowed by the University. The Contractor shall provide all of his own vertical transportation by means of cranes, hoists, and/or lifts for materials and stairs for personnel.

#### 1.11 CONTRACT DOCUMENTS FOR THE CONTRACTOR

A. The Contractor will be provided, free of charge, sixteen (16) sets of drawings and specifications. Additional sets may be obtained at the cost listed in the Instructions to Bidders as the "Deposit" amount. (No refunds will be given). Subcontractors shall obtain sets from the Contractor; free sets will not be issued to Subcontractors, by the Architect/Engineer or University.

#### 1.12 CONDITION AND CARE OF SITE AND PROJECT

A. Refer to Article 4.14 of General Conditions. From the time the Contractor and subcontractors for this Project commence work at the site until their Contracts are completed, Contractor (and/or subcontractor) is responsible for the care of the site and Project to the extent his work, acts, operations or use of the site affects the site and Project, subject to the rights of the University and the University's workmen thereon.



B. The Contractor shall confine his apparatus, materials, equipment, shacks and operations of workmen to the site limits indicated on drawings or otherwise imposed by law or ordinance. The site and Project shall not be unreasonably encumbered with materials and equipment. Neat and orderly stockpiling and other operations shall be maintained and debris shall be regularly removed from the building. Before any work is started, Contractors shall meet with the University and agree to the use of available areas for storage. The Contractors shall then confine their storage and operations to said agreed limits and to University directions.

C. All improvements in or about the building which are not shown to be altered, removed or otherwise changed shall be restored to the conditions which existed previous to starting work. All existing buildings, structures, or other features shall be protected from damage by any operation in connection with the Project. Each Contractor shall replace or repair, at his own expense (and to the satisfaction of the University), all damage to existing buildings, sidewalks, curbs, drives, lawns, plants, trees, shrubbery, and other property resulting from work of his Contract, from whatever cause.

D. The General Contractor shall install and maintain temporary board or plank protection at all sides of openings in finished or exposed construction where materials may be moved, including (but not limited to) sills and jambs of door, window or similar openings through which material may be passed. Any damaged surfaces shall be removed and replaced as directed.

E. Utilities or other services which are shown, or not shown but encountered or otherwise found, shall be protected by the Contractor from any damage from excavation or other work and operations of this Contract, unless or until they are abandoned. If the utilities or services are not abandoned, or to be abandoned, the Contractor shall immediately restore any damage from his work or operations to place the utilities and service in an equal or better condition to that which existed. Where utilities or services are shown to be abandoned or moved, they shall remain in service, and be protected by the Contractor, until new utilities and services have been provided, tested and are ready for use.

F. Insofar as practicable, the drawings indicate all existing systems which must be removed and/or relocated to provide proper clearances for new work. If, however, the Contractor finds existing work, not noted for removal, which interferes with the new work, he shall immediately notify the University and request instructions. In no case will additional compensation be allowed for removal or relocation work pursued without instruction nor for correction of errors resulting from such work without instruction.

G. The normal functions of the University and Campus shall not be disturbed, except within the construction areas of this Contract. Except when work is in progress at areas indicated for Work to be performed, or as otherwise necessary to complete the Contract, all walks, driveways, parking areas, and entrances shall be kept clear and free of all Contractor's equipment, material and debris at all times. Remove debris promptly.

H. The University will continue to occupy the surrounding areas and buildings and continue the normal functions, including parking and delivery. The University's employees and staff shall have full access to surrounding areas and shall be allowed to perform their duties therein without any restriction. See Article 1.13 herein.

1. The University reserves the right to let other contracts in connection with this Project, the JOML Complex, or in connection with adjacent existing buildings. This Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and execution of their work, and shall properly connect and coordinate his work with theirs.

#### 1.13 WORK IN AND AT EXISTING AND OCCUPIED BUILDINGS

A. Refer to Section 01200 for constraints, schedule and timing requirements and 01500 for temporary closures for work in and around existing buildings.

B. In addition to the commencement and completion of work at various areas being scheduled in the Contractor's Construction Schedule, the Contractor shall verify the timing and advise the University in advance of work in all existing and occupied spaces, to permit the spaces to be vacated and related arrangements to be made.

C. Materials and equipment shall be assembled, including that of subcontracts, and subcontractors committed to a firm schedule, prior to commencing work to accomplish the work as expeditiously as possible. After work commences in any existing space it shall be continued without interruption to completion, except where work phases require otherwise.

D. All work shall be accomplished to cause a minimum of disruption of the University's activities, uses, functions and programs in the building, as approved by the University.

E. Contractor shall provide a uniformed traffic director who shall be present whenever materials are delivered to the sites. The Traffic Director is to insure that Church Street and Delaware Street are open at all times. Access to Mayo Garage via these streets for Fire Department, auto and ambulance is to be maintained at all times. The Traffic Director is to insure that the Mayo Courtyard is accessible to the Fire Department at all times.

F. In order to minimize traffic control problems material delivery hours are limited to 1:00 P.M. to 3:30 P.M. Mondays through Fridays.

G. Material deliveries are to be scheduled appropriately so that trucks are promptly unloaded upon arrival at the site.

#### 1.14 LAYOUT OF THE WORK

A. The General Contractor shall locate and layout the work with relation to reference points. The General Contractor shall consult with the University and demonstrate to the University's satisfaction that significant points and elevations are correctly established.

B. Contractor shall correctly locate his work in relation to the existing building features, to all requirements imposed by the drawings and good construction practice. Contractor shall verify the locations of all existing work to which his Work must fit and all lines, levels and dimensions shown on the drawings and report any errors or inconsistencies in above to University before commencing work.

C. As the Work progresses, the General Contractor shall lay out the exact location of partitions and similar features, as guide to all trades.

D. The Contractor shall recognize that the drawings necessarily are diagrammatic, in many instances. All work and in particular exposed piping, ducts, conduit and similar items shall be neatly and carefully laid out to provide the most useful space utilization and the most orderly appearance. Piping and similar work shall be installed as close to ceilings and walls as conditions permit, located to prevent interference with other work or with the use of the spaces in the manner required by the functions of the room and staff. Valves shall be located in inconspicuous places. Before proceeding with any work, particularly where exposed, the Contractor shall carefully plan the layout and review it with the University for acceptability of location.

#### 1.15 REFERENCES TO STANDARDS AND CODES

A. If the Contractor observes that the drawings and specifications are at variance with any applicable code or regulation of a governmental unit having authority, he shall promptly notify the University and Architect in writing, and any necessary changes shall be adjusted as provided in the Contract for Changes in the Work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the University, he shall bear all costs and damages arising therefrom.

B. The standards referred to, such as ASTM, Federal Specifications and similar standards, shall have full force and effect as though printed in the specifications, except as modified in the specification. These standards are not furnished to bidders and the Contractor as it is assumed that manufacturers and trades involved are familiar with their requirements.

C. Any material specified by reference to the number, symbol or title of a specific standard, such as ASTM, Commercial Standard, a Federal Specification, a trade association standard, or other similar standard, shall comply with the requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of The Contract Documents, unless otherwise noted.

D. For products specified in accordance with a Federal Specification, ASTM Standard, American National Standards Institute or similar association standards, upon request the Contractor shall provide an acceptable affidavit by independent testing laboratory, or other source approved by the University and Architect, certifying that product furnished for this Project complies with particular standard specifications. Where necessary, requested or specified, supporting test data shall be submitted to substantiate compliance. The manufacturer is subject to Architect's acceptance.

#### 1.16 CHARACTER OF WORK, MATERIALS AND INSTALLATION

A. The Work shall conform in all respects with requirements of all Contract Documents, and workmanship shall be first quality, the best obtainable at the present state of the crafts. Incompetent or careless workmanship shall not be permitted by the Contractor and will not be accepted by the University.

B. If, in opinion of the Contractor (or any Subcontractor) any Work is indicated on drawings or specified in such manner as to make it impossible to produce Work of highest quality, within space shown, or which may be considered improper for use and conditions, including the effects of expansion and contraction, or should discrepancies appear between drawings, or drawings and specifications, the Contractor shall refer same to the University and the Architect before proceeding. If the Contractor does not request such interpretation, no excuse will be entertained thereafter for failure to carry out and guarantee the Work in a satisfactory manner. Elements of the Work intended to protect against weather shall be guaranteed weather and water tight.

C. Proper performance of the Contract shall imply, among other things, correct and proper placement, proper or published results for products and equipment, fitting and operation of fixed or movable and operating parts of the Work, including doors, windows, hardware and all systems and equipment. All materials and equipment shall be complete in every respect, with all parts, connections, anchors, devices, backing, fittings and other necessary items, and shall be completely installed, anchored, fitted and placed in operating condition. Before buying, constructing or installing work, the Contractor shall notify the University and the Architect of any conditions which may exist in the Contract Documents which will affect proper operation or first quality installation.

D. Throughout project, various materials and pieces of equipment are fitted to others, various materials are applied to which other materials attach and similar installation relationship. Each manufacturer, Contractor and subcontractor shall take all reasonable precautions to insure his materials, devices, items, equipment or other products can be satisfactorily applied or installed to each other or work of others and he shall make necessary adjustments during preparation of shop drawings or in advance of field or shop work to accommodate other work to prevent unsatisfactory items or installation.

E. All materials or equipment shall be installed or applied according to directions of the manufacturer or recommendations of an association dealing primarily with materials, unless specifically designated otherwise. In no case shall the installation, including any temporary work necessary (i.e. shoring), be below the standard recommended by the manufacturer. Where specified requirements exceed the manufacturer's standards, the specification shall govern. Fabrication (including reinforcing and accessories) and installation shall be provided to insure proper placement and use of the item or material under the location, use, condition and available space to serve intended function and to meet code requirements.

F. Equipment and devices shall be provided and installed to "fail safe" in all circumstances and it shall be Contractor's obligation to provide and install work in such manner.

#### 1.17 GUARANTEES

A. In addition to the general one year guarantee on all Work under this Contract, any extended guarantee of the manufacturer on any item shall be provided to the University as a part of this Contract, and shall remain in force and effect for the University.

B. The Contractor shall complete all manufacturer's warranty registrations for all items, components and units so warranted, and shall file copies of the warranties with the University. Manufacturer's standard warranties for periods shorter than one year shall not limit the one year guarantee period by the Contractor as required under the Contract.

#### 1.18 PROPOSED MATERIALS AND EQUIPMENT

A. Refer to Article 12 of the Instructions to Bidders, Paragraph 7.13 of the General Conditions and Article 2.3 of Section 01300, Submittals. The Contractor shall provide materials, articles, equipment, systems and other items (products) that have been specified, or listed in addenda, under the specified conditions and criteria. Requests for the use of alternate products after bids have been received will not be considered, nor changes allowed in the accepted list of products, except when the specified or accepted product subsequently is determined as not meeting the requirements of the Contract Documents or the product becomes unavailable, and then only under the following conditions:

1. The Contractor (or subcontractor) has placed orders for the specified materials and equipment (products) promptly upon award of contract and acceptance of list. No excuse or proposed substitution will be considered for products due to unavailability unless proof is submitted that firm orders were placed immediately.

2. The reason for unavailability is beyond the control of the Contractor. Unavailability will be construed as being due to prolonged strikes or lockouts which will seriously delay the entire Project to an extent the University finds unacceptable, bankruptcy, discontinuance of manufacture of a product or Acts of God.

3. The request for the use of an alternate product is submitted in writing within 10 days after the date the Contractor has ascertained the product does not comply with the specifications or has become unavailable, accompanied by supporting evidence.

4. The Contractor proposes to use an alternate product that was specified or listed in an addendum, along with complete data on the product.

5. There is no extra cost to the University.

6. The alternate product is acceptable to the University and Architect.

B. If, after acceptance of the Contractors proposed list of materials, required under Section 01300, by subsequent evidence or investigation the University or Architect determines a product has been misrepresented and will not comply with, or perform in accordance with, the Contract Documents, they shall have the right to require a change to a complying product without increase in cost to the University.

#### 1.19 PROTECTION IN GENERAL

A. Refer to Article 10 of the General Conditions, Section 01500 and other Articles of this Section 01010 for more specific requirements. The University may require the Contractor to provide additional protection, where protective

measures appear inadequate, but assumes no obligation to do so nor any responsibility of the Contractor to provide all protection required for persons or property.

B. When it is noted or specified for a particular Contractor to provide protection, it is the intent that Contractor provides the basic routine or normal protection, but shall not be construed to establish the total responsibility, as each Contractor shall have the protection responsibility as affected by his Work, labor, operations, materials, equipment spaces and similar conditions.

C. Each Contractor shall provide protection for all his own equipment, hoists, and other facilities, used in the prosecution of the work to prevent operation by unauthorized personnel.

D. Any work on the roof or other membranes, after membrane has been installed, shall be done over planking, plywood or other suitable protection, to spread loads under walkways and at all work areas, including around ventilating bases, with the protection provided by the Contractor whose work is being done over the membrane. There shall be no exceptions to this requirement and the General Contractor shall advise the University of any violations by other Contractors.

#### 1.20 SPECIAL REQUIREMENTS AND CAUTIONS

A. Refer to Sections 01200 - Contract Time, 01300 - Submittals, 01500 - Temporary Facilities 01910 - Cutting, Removal and Patching, other articles of this Section and technical sections for other special requirements.

B. In deference to the welfare of patients in adjacent hospital buildings, no operations creating loud noises will be allowed between the hours of 8:00 P.M. and 7:00 A.M. This shall include such operations as jack hammering and other noisy operations and equipment.

C. Any work required outside the normal working hours (8:00 A.M. to 5:00 P.M.) shall be specifically scheduled with and approved by the University, who will coordinate with University Hospitals.

D. At no time shall Contractor's vehicles be allowed to obstruct traffic on the streets or sidewalks adjacent to the site nor to drive over any sidewalk unless it has first been planked to protect from overloading.

#### 1.21 ANCHORAGE, SUPPORTS AND SLEEVING

A. The requirements of technical sections of the specifications or as shown on drawings, which are more specific or in excess of the general requirements herein, shall take precedence over these general requirements.

B. The Contractor and his subcontractors shall furnish and install proper anchorage devices to securely and in the best manner, fasten, hang, mount, anchor, support all work in a neat and substantial way. Unless otherwise specified, subcontractors shall furnish all devices for fastening their work together and for fastening to the structure.

C. The Contractor and each subcontractor shall furnish and install all their own sleeves, anchors, inserts and other devices as work progresses to accommodate their own materials or work. Methods and devices, as well as location, may be subject to the Architect's and University's approval and

shall not impair, violate or alter structure, water integrity or aesthetic value of the Work.

D. In general, provide bolts and shields for anchorage to solid materials, toggle bolts into hollow construction or through bolts and washers where necessary, unless otherwise shown or specified. Wood plugs into solid materials, toggle bolting to vertical lath and plaster, or bolting into shields at hollow units, will not be acceptable. The Contractor shall provide adequate backing for all fastenings and supports to prevent pull-out, deflection or undue stresses. For concrete, anchorage devices shall generally be cast-in, not drilled in later, unless otherwise specified.

E. At concrete, shot or drilled-in anchor devices will be permitted where casting-in may be difficult to coordinate, provided they will not damage the concrete or cause any spalling around the anchor. Shot anchors will not be permitted in bottoms of joists, in the underside of slabs 4" or less in thickness nor where spalling may result. Any shot anchors at concrete joists shall be at the side of the joist, above centerline. A representative number of anchors shall be field loaded above anticipated loads to insure their adequacy. Drilled-in expansion anchors, which have the same hole size as the bolt size, such as "Kwik-Bolt" or "Wej-it" will be permitted provided there is no spalling around the holes, the holes are neatly drilled and approved test reports indicate adequate shear and pull-out strength with ample safety factor.

F. Sleeves shall be provided for all pipes, conduit and similar features that pass through walls, floors, roof slabs, concrete joists, concrete beams or girders, or concrete bridging, whether specifically indicated or not. (No sleeves permitted thru columns). Sleeves shall be provided by the Contractor or the Subcontractor requiring the hole for his work. At all concrete penetrations sleeves shall be uncoated or galvanized pipe, not less than Schedule 40 steel pipe. At exposed or concealed masonry walls, sleeves shall be same as for concrete penetrations. Unless otherwise called for, sleeves passing through walls, slabs, beams, bridging, shall be 1/2" greater in inside diameter than external diameter of pipe (including insulation), or conduit passing through the sleeves. All sleeves shall be of new material, cut square, reamed. Sheet metal sleeves may be used only where specifically approved. Unless otherwise called for: sleeves through walls shall extend full thickness of wall and be cut flush with finished surface; sleeves through exterior building walls, above or below grade shall extend full thickness of wall and be cut flush with finished surface; sleeves through floor slabs for piping where piping or conduit will be exposed shall extend 1/2" above finished floor except at potentially "Wet areas" (all equipment rooms and similar spaces) the sleeves shall extend 1 1/2" above finished floor; where concealed, sleeves through floor shall be cut flush with floor. Where sleeves occur in rows or clusters, a minimum of 4" of concrete shall be left between sleeves and if the normal spacing of reinforcing bars cannot be maintained, or are interrupted because of sleeve size or cluster locations, extra reinforcing shall be provided as directed by the Architect. In no case shall sleeves impair the structural capability of the Work.

G. Sleeves at core drilled holes shall conform in dimension, material and height to the requirements of paragraph F above. The sleeves shall provide a good fit to core drilled hole and shall be set in place with a full coating of approved epoxy adhesive to insure remaining in place and a good seal between the hole and the sleeve.

H. As pipe, conduit or other feature is installed through a sleeve, it shall be wedged to keep in the center of the sleeve, with wedges held 1" back from end of sleeve. Pipe, conduit or other features through walls or other vertical surfaces, shall be caulked both sides of wall, exposed or concealed. Pipe, conduit or other features through floors and roofs shall be caulked at the top in all cases, and at the bottom where exposed in a finished space. An approved rod-stock backing for sealant shall be inserted around the pipe, conduit or other feature, held back 1/2 inch from end of sleeve. Sealant shall then be applied, sloped up about 20 degrees to the pipe to form a watershed. The sealant shall be G. E. Silpruf Sealant, or approved equal, with a Shore A hardness of 40 to 50, color as selected by Architect. All sealant work shall be provided by the Contractor installing the pipe or conduit and shall be installed in accordance with the workmanship provisions, including clean surfaces, of Section 07900 of these specifications. At all penetrations through roof and floor slabs, fire and smoke rated walls or partitions and shaft or core enclosing walls, the space between the sleeve and pipe shall be provided with an approved fire stop. Prior to placing the rod stock backing and sealant, insert Johns-Manville, Cerablanket-FS ceramic fibre blanket insulation filling the entire space between sleeve and pipe or conduit, a minimum of 1-1/2" in depth. Hold back from edge of sleeve to allow for rod stock backing and sealant. Installation shall be made to maintain an effective fire stop. (Cerablanket material available from Tremco).

#### 1.22 CLEANING UP

A. Refer to Paragraphs 4.16 and 6.4 of the General Conditions and Section 01700, Project Closeout. It is the intent the site and building areas be maintained in clean, neat and free of debris at all times.

B. In addition to removing rubbish, waste materials, packing materials and other debris as it is generated, the job site shall be cleaned up by noon each Friday. Contractor shall assign sufficient labor to accomplish the cleanup. In the event the Contractor fails to maintain the building clean and free of debris, the University will have it done by others and assess the cost to the Contractor.

C. At least monthly, the General Contractor shall sweep or vacuum the floors of the building areas of work. The General Contractor shall sweep or vacuum the major access areas (entrances, elevator lobby, major traffic corridors, and similar areas) as often as necessary to keep them reasonably free from dirt and debris as approved by the University.

D. During finishing operations in particular, care shall be taken by each sub-contractor to remove his debris after working in a partially finished space. The General Contractor shall continue to sweep or vacuum the areas as specified under C above, and he shall require his sub-contractors to remove stacks or piles of cartons, rubbish or debris.

E. Contractor may, at his own option, remove one pair of double hung windows from the west elevation of each of the second and third floors for use in placing materials inside and for use in debris removal. If such option is exercised, Contractor shall carefully observe floor load limits. For debris removal, Contractor shall provide chutes to containers or trucks below in order to prevent scattering of dust and refuse in the vicinity.



## PART I: GENERAL

1.1 BASIS FOR PAYMENT

- A. Refer to the Bid Form and General Conditions Article 9.
- B. The basis for payment is a lump sum for all work under the Contract, to be paid in increments as the progress of the Work permits. Adjustments in the lump Contract Sum will be made only pursuant to, and upon approval of Change Orders in accordance with Article 12 of the General Conditions.
- C. The University will make payment directly to the Contractor in accordance with the General Conditions and the conditions specified herein.

1.2 SCHEDULE OF VALUES

- A. Refer to the General Conditions, Paragraph 9.2.
- B. The form and detail of the Schedule of Values (cost breakdown) shall be acceptable to the University and shall provide the means for simple and ready monitoring of the Work satisfactorily completed and eligible for payment. The Schedule shall provide the means for evaluating the extent of completion of each line item and the quantities of products, equipment or materials, as well as determining the state of completion of other costs incorporated into the Contract Sum.
- C. The Contractor shall develop a Schedule of Values for review and acceptance by the University and revise as may be required by the University. The Schedule of Values shall bear a sworn, notarized statement by an officer of the contracting firm that the Schedule of Values represents a true and accurate allocation of costs of the Contract Sum and that each item includes its proper share of overhead and profit.
- D. The costs of General Conditions and Division 1 items (i.e.: bond, insurance, temporary facilities, etc.) and similar non-material costs shall be listed individually, with unit or increment quantities and their prices where applicable.

1.3 PROGRESS PAYMENTS

- A. Refer to General Conditions, Paragraph 9.3.
- B. On the first Request for Payment, the University will make payment for the value of the Performance Bond and similar lump sum cost items which must be paid in full by the Contractor at the start of the Work. Thereafter, no further payments will be made until a bona-fide and substantial on-site start has been made.
- C. Progress billings (Requests for Payment) shall indicate the detailed and itemized costs of the Work for which the current Request for Payment is made and a summary total of costs previously billed and payments made.

#### 1.4 RETAINAGE

- A. Refer to General Conditions Subparagraphs 9.3.7 through 9.3.12.
- B. Ten percent (10%) of the satisfactorily completed work of the Schedule of Values, as approved by the University on Requests for Payment, will be retained until 75% of the work is satisfactorily completed. Thereafter, no additional sums will be retained.
- C. If at any time after the reduction in any retained percentage, there appears reasonable evidence that the work is not proceeding satisfactorily, including the appearance of defective materials and workmanship, or the work is not on schedule, the University may again retain such amounts as it deems necessary to protect its interest until such time as all requirements for reducing the retainage are again satisfied.
- D. Final payment of retained amounts will be made after final completion of the Work of the Contract except as provided in Paragraph 9.7.5 of the General Conditions.

#### 1.5 UNIVERSITY EXAMINATION

- A. Refer to General Conditions, Subparagraph 9.3.5. Any materials or equipment the University agrees to pay for in off-site storage, shall be stored in the Metropolitan Twin City Area. Upon submittal of a Request for Payment for materials in the Contractor's off-site storage, the University will examine the materials, with travel cost, any subsistence and time of University personnel paid by the University. The Contractor shall provide access, facilities and assistance to verify the accuracy of the materials claimed as complete, relating to the Schedule of Values.

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## PART 1: GENERAL

1.1 GENERAL REQUIREMENTS

A. Refer to General Conditions, Article 8, for general requirements and conditions relating to the contract time, commencement of the Work, progress, completion and delays. Refer to Sections 01010 - General Requirements, Section 01300 - Submittals, Section 01500 - Temporary Facilities, Section 01700 - Project Closeout and Articles of this Section which relate to the commencement, schedule, progress and completion of the Work.

B. The Work shall be prosecuted regularly, diligently, without interruption or shutdown at such rate of progress as will insure Substantial and Final Completion within the Contract Time. By execution of the Contract, the Contractor represents he has analyzed the Project, the materials and methods involved, the systems of the building, availability of qualified mechanics and unskilled labor, restrictions of the site, constraints imposed, his own work load and capacity to perform the Work and indicates his agreement that the specified completion times are reasonable considering the Project conditions, usual industrial conditions, climatic conditions prevailing in the locality of the Project, and other factors, with reasonable allowance for variations from average, typical or ideal conditions.

## PART 2: COMMENCEMENT AND COMPLETION OF PROJECT

2.1 COMMENCEMENT OF WORK

A. The Contractor shall commence the Work at the site as soon as possible after required and proper insurance evidence has been submitted to the University. All submittals shall be prepared and submitted by the specified times and temporary heat, light and power shall be installed where required, without delay.

B. The Contractor may assume site management and commence work within 14 days after the University's Notice to Proceed or execution of the Contract, whichever occurs first. However, he shall not commence work until he has confirmed his delivery dates for structural steel so that foundation work, steel erection and enclosure can be pursued in an orderly and continuous manner. It is intended that maximum care be exercised in protecting the water integrity of the existing structures throughout the construction period. University approval of commencement day shall be required as an essential condition of the Construction Schedule. See Article 3.2 herein.

C. It shall be noted that access to the portion of the site contiguous to the Unit B/C Contract Limits is under the site management of the previous Contractor. Because of the relative scope of work on the Southeast Tower, site management of that area must remain with the other (Unit B/C) Contractor and this JOML-A Contractor must submit to the scheduling and instruction of the other Contractor, pertaining to access through and use of the Unit B/C Site.

D. Once work on the site has commenced, the Contractor shall pursue the work continuously and diligently to completion within the specified time.

## 2.2 COMPLETION SCHEDULE

A. Refer to General Conditions Subparagraphs 7.1.5 and 7.1.6 for definitions of Substantial Completion and Completion. Within the framework of the general definitions, the University shall be the judge of the status of completion. The definitions shall apply to the Project as a whole as well as separable spaces or areas where the University may assume beneficial occupancy or use of the facilities.

B. The definition of beneficial occupancy or use shall include allowing the work of another contractor within the Contract Limits of this JOML-A Contract.

C. During the period in which other contractors are on the site and the JOML-A Contract is not yet complete, the JOML-A Contractor shall be responsible for site management until such time as he is released at final completion of his work.

D. Certain areas and phases of the Project are required by the University to be substantially completed before the entire Project is complete, and have more critical requirements for occupancy by the University, to accommodate other phases of Work, and other Contracts and to coordinate with other construction. The commencement dates and sub-completion dates for various areas or phases, as specified or as later developed in the Construction Schedule of the Contractor, shall be essential conditions of the Contract, as well as completion of the entire Project.

E. At any space or area specified, or later scheduled, to be occupied or used by the University before the entire Project is complete, all elements and systems of the Work shall be substantially complete in these areas by the scheduled time.

F. Substantial Completion of the entire Project shall be accomplished on or before 210 calendar days after Notice to Proceed or execution of Contract whichever is earlier.

G. Final Completion of the entire Project shall be accomplished within 21 days after Substantial Completion. Final Completion of any area or space occupied or used by the University or accepted for other work to commence prior to completion of the entire Project, shall be accomplished within 14 days after the specified or scheduled substantial completion, unless otherwise approved by the University.

H. In addition to the time of commencement, substantial completion and final completion dates, other events, factors, and constraints shall be carefully considered in establishing the work progress for the Project. The contractors and subcontractors shall work closely in timing of operations and shall have materials, equipment and other elements ready (in off-site storage, where necessary) to be able to immediately fulfill their obligations in the overall schedule. Consideration shall be given the time required for the Owner to move in the Project, as well as the work that follows various installations.

## 2.3 EXTENSION OF TIME

A. Refer to General Conditions, Paragraph 8.3, for requirements for time extensions. Time extensions will be allowed only for the portions, phases or

elements of the Work affected by the enumerated conditions for valid delay. Extension of the time for completion of the entire Project will be allowed only for such valid delays as will affect all Work of the Contract.

### PART 3: TIMING OF WORK

#### 3.1 UNIVERSITY ESTABLISHED CONSTRUCTION CONSTRAINTS AND COMPLETION TIMES

A. Work at the site shall be carefully coordinated among the various sub-contractors and vendors of this Contract and with the separate (future) Contractor, as well as the University and its agencies, and the Unit B/C Contractor. All periods stated shall be in consecutive calendar days.

B. The affected areas of the adjacent existing buildings will be made available to the contractor at the time of the Notice to Proceed. The Contractor shall immediately prepare dust-tight temporary partitions as close as possible to the cutting and removal work so as to allow occupancy and use of these existing spaces by the University within 21 calendar days after Notice to Proceed.

C. After temporary partitions are placed the Contractor may proceed with the demolition and removal work required to accommodate the new construction.

D. The Contractor will not be allowed access to the interior of existing spaces except on the construction side of the temporary partitions unless he has made prior arrangements with the University.

#### 3.2 CONSTRUCTION SCHEDULE

##### A. Initial Schedule:

1. Within 10 days after issuance of Notice to Proceed or execution of the Contract, whichever comes first, the General Contractor shall prepare the Construction Schedule for scheduling and management of the Project.

2. Within thirty days from the Notice to Proceed, the General Contractor shall provide the Architect, the Owner, and all sub-contractors with copies of the Schedule.

3. The Construction Schedule shall contain detailed representation of all significant aspects of the construction plan, including, but not restricted to, site preparation, structural work, exterior finishing, electrical and mechanical work, shop drawings submittal, review and revision, materials delivery, and acquisition and installation of fabricated equipment and materials. A weekly time period shall be followed for all activities.

4. The Construction Schedule shall generally conform to the Schedule of Values required under the General Conditions and Section 01150 so that progress can be monitored and compared with application for payment.

##### B. Updating Schedule:

On a set date each month, established by Contractor in cooperation with University, Contractor shall revise his schedule, as necessary to reflect actual progress and correct for critical delays in the work and return the work to a satisfactory schedule. Each schedule revision shall be submitted to the University for his use in monitoring progress.

## PART 1: GENERAL

1.1 SCOPE

A. This section defines procedures for the following submittals required of the Contractor.

## PART 2: REQUIRED SUBMITTALS

2.1 SHOP DRAWINGS, EQUIPMENT BROCHURES AND PRODUCT DATA

A. Required submittals of shop, fabrication, or erection drawings, equipment brochures and/or product data, composite systems (including those by one or more Subcontractors or suppliers) and similar information shall be submitted in accord with this Article.

B. "Shop Drawings" shall mean all similar types of product data, including specially prepared drawings, standard prints, brochures and other descriptive data.

C. Drawings submitted, including transparencies, shall be marked with name of project, Contractor, Architect, whether "preliminary" or "final" in nature, and shall bear stamp of approval of the Contractor, as evidence that drawings have been checked (including field dimensions) by the Contractor. The Contractor shall field verify or otherwise determine interferences or conflicts between various materials and resolve dimensions or methods resulting therefrom as approved by the Architect and University. Any drawings submitted without the Contractor's approval will not be considered or reviewed and will be returned to the Contractor.

D. The Contractor shall submit shop drawings to the Architect with such promptness as to cause no delay in his work or the work of any other contractor or subcontractor on the project. Adequate time shall be allowed for checking by the Architect and University. Contractor shall submit schedule of submittals within 21 days after Notice to Proceed.

E. Prepared shop drawings shall be submitted in the form of clear, sharp reproducible transparencies until acceptable to the Architect. Each drawing shall have a clear space of not less than 20 square inches for Architect's stamps and be transmitted, rolled, in mailing tubes. After the drawings have been checked, the Architect will obtain prints of the transparency for his records and the University's records and return the transparency to the Contractor. Transparencies returned "Accepted" or "Accepted as Noted" shall be printed by the Contractor in quantity required for his use. When drawing transparencies are returned "Not Accepted" or "Resubmit", the Contractor shall correct the drawing and resubmit a new transparency of the corrected original until final acceptance is obtained. The final shop drawings shall show field verified dimensions.

F. It is not intended that field verified dimensions are required prior to the Architect's acceptance of shop drawings. If however, field dimensions require changes in the shop drawings in size, detail and similar considerations, a revised shop drawing shall be submitted for review and acceptance.

G. Transparencies will not be required for catalog cuts, equipment brochures or similar items; however, layout drawings shall be prepared where necessary or required by the Architect. Such items shall be submitted in a minimum of 7 copies unless otherwise specified. If acceptable, the copies will be so stamped and 3 copies returned to the Contractor. If notations indicate revision of data is required, resubmit as directed. The Contractor shall not furnish, fabricate, proceed with, or install work until shop drawings receive final acceptance.

H. Checking and acceptance of shop drawings by the Architect is for general conformance with design intent and Contract requirements and does not relieve the Contractor of responsibility to verify accuracy of dimensions, obtain field dimensions, coordinate dimensions with work of others, and prevent interference with other equipment and other features of the Work. If a drawing as submitted is in accordance with Contract requirements, or specifically indicated deviation from Contract requirements which Architect finds to be in interest of University and to be so minor as not to involve a change in contract price or time for performance, Architect will accept drawings.

I. Acceptance of shop drawings and setting drawings will be general and, except as otherwise provided in preceding paragraph, shall not be construed as: (1) permitting any departure from contract requirements, (2) relieving Contractor of responsibility from errors in details, dimensions or otherwise that may exist, (3) accepting departures from additional details or instructions previously furnished by Architect and, (4) confirming clearances or lack of interference.

J. Checking and acceptance by Architect shall not relieve Contractor of responsibility for deviations from drawings and specifications unless such deviation is specifically called to Architect's attention by a specific indication of "note deviation" or similar clear and bold indication at time of submission, nor shall it relieve him of responsibility for errors or omissions in shop drawings.

K. Refer to Article 6 of General Conditions and to Article 1.8, of Section 01010 for coordination and cooperation of contractors. This Contractor shall cooperate with all other contractors as may be required to coordinate the work of all contractors and their subcontractors. Shop drawings shall be provided or exchanged as necessary or beneficial to the coordination effort, with the exchange directly by the contractors involved, not through the University or Architect.

## 2.2 SAMPLES

A. Deliver samples of materials, equipment, assemblies and components as required by specifications to Architect (or other designated location) with delivery costs prepaid. At Architect's direction, remove samples after approval. Samples shall be of like kind to the product to be provided for building and shall have finish and other characteristics required by work. Samples shall indicate type of construction and quality proposed for installation in the Project.

B. Where the Contractor requires approved samples to be returned, submit the number of samples required by the Contractor plus two which shall be retained by the Architect and University. Submit all other samples in duplicate.

### 2.3 LIST OF MATERIALS

A. Within 14 days after the award of the Contract (notice to proceed or letter of intent), the Contractor shall submit 5 copies of a complete list of all materials, products, and equipment proposed to be used in construction to the Architect for acceptance. Materials shall not be ordered until the proposed listed materials are accepted.

B. Where two or more makes or kinds of items are named in the specifications (or additional names are called for in an addendum), the Contractor shall state which particular make or kind of each item he proposed to provide. If the Contractor fails to state a preference, the University shall have the right to select any of the makes or kinds named without change in price.

C. This list shall be submitted on the form prescribed by the Architect and arranged in order of specification sections. The items listed shall fully conform to project requirements and specifications. All materials are subject to the Architect's and University's acceptance. After acceptance, there shall be no changes or substitutions, except as provided in Article 7 of the General Conditions and Article 1.18 of Section 01010.

D. The list shall clearly identify the material, product or equipment by manufacturer and brand by listing the names for all items, including those where only one material or product is specified. Each and all materials, products and equipment shall be specifically named, not listed "as specified".

### 2.4 LIST OF SUBCONTRACTORS

A. Within 14 days after the award of the Contract (notice to proceed or letter of intent), the Contractor shall submit 5 copies of a complete list of all subcontractors (and major material suppliers) he proposes to use in performance of the Contract to the Architect for review and acceptance by the Architect and University. The list shall be in the form prescribed by the Architect. When appropriate, or when requested by the Architect, the list shall include proposed Sub-subcontractors. No subcontracts shall be executed until the proposed list subcontractors are accepted.

B. The proposed subcontractors or sub-subcontractors shall be established, reputable firms of recognized standing with a record of successful and satisfactory past performance with the type work and/or items proposed to be provided or installed by them. Only those subcontractors (and sub-subcontractors when appropriate) who are acceptable to the Architect and the University shall be used on the Work.

C. The right to reject any subcontractor or sub-subcontractor, is reserved by the Architect and University. The right to reject will be exercised by the Architect or University as specified under sub-paragraph 5.2.3 of the General Conditions.



## 2.5 RECORD SET OF DRAWINGS

- A. Contractor shall provide a record set of drawings to the University at the completion of Contract.
- B. During construction, Contractor shall maintain a clean set of drawings for the sole purpose of recording changes and actual "as installed" information.
- C. Marking of the record set shall be done methodically as work progresses, clearly and neatly, in color.
- D. As a general guide, the type of information to be recorded on the record set includes: (1) revisions made except minor or non-critical dimensions; (2) omissions, including work omitted by accepted alternates; (3) dimensioned locations of major or main utility lines, such as main conduit runs, piping mains and similar work; (4) locations of control valves; (5) additions to the work; (6) changes in significant details (i.e.: for water protection); and (7) other similar data.

## 2.7 OTHER SUBMITTALS

- A. Provide other required submittals as specified. In particular, refer to:
- |   |   |
|---|---|
| Progress Schedule   | Paragraph 4.11 of General Conditions, and Sections 01200, 01250.              |
| Performance Bond  | Paragraph 7.5 of General Conditions   |
| Schedule of Values  | Paragraph 9.2 of General Conditions and Article 1.2 of Section 01150          |
| Payment Requests  | Paragraph 9.3 of General Conditions and Articles 1.3 and 1.4 of Section 01150 |
| Liability Insurance   | Paragraph 11.1 of General Conditions  |
| Property Insurance  | Paragraph 11.2 of General Conditions  |
| Equal Employment and Prevailing Wages   | Articles 15 and 16 of General Conditions                                      |
| Testing and Inspection  | Section 01400 and Technical Sections  |
| Form 134 Affidavit  | Subparagraph 9.7.2 of General Conditions                                      |
| Project Closeout Requirements   | Section 01700   |
| Reports<br>Certificates<br>Samples<br>Guarantees (including roof maintenance and Guarantee) | Technical Sections  |

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## PART I: GENERAL

1.1 TESTING

A. Refer to technical specifications for specific testing requirements and methods.

B. Unless otherwise provided in the specifications, the Contractor shall provide all materials, samples, mock-ups or assemblies for all tests specified in various sections of specifications or as directed by Architect or University and pay shipping costs of such samples to laboratory or other testing location and facility. Unless specifically specified otherwise, all tests shall be made by an approved independent testing laboratory and reports shall be provided to Architect and University.

C. Tests shall be provided and accomplished in accordance with the standard used as the reference for the particular material or product, unless other test methods or criterion are specified. In the absence of a referenced standard, tests shall be accomplished in accordance with applicable ASTM Standards or Test Methods as determined by the Architect and the University.

1.2 QUALIFICATIONS OF TESTING AGENCY

A. "Approved independent testing laboratory" shall mean an independent testing agency acceptable to the University and the Architect and possessing the professional qualifications and equipment to perform the specified tests and to evaluate and report the results.

1.3 PAYMENT FOR TESTS

A. Where specifically specified, the University will pay for the costs of tests (field or laboratory), directly to the laboratory. The University will also select the testing agency and advise the Contractor.

B. The cost of all other tests shall be paid by the Contractor, including any retesting required when initial tests indicate non-compliance.

1.4 TESTS TO DEMONSTRATE QUALIFICATION

A. In addition to tests specified, should the Contractor propose a product, material, method or assembly that is of unknown or questionable quality to Architect, the Architect or the University, may require and order suitable tests to establish a basis for acceptance or rejection. Such tests will be paid for by the Contractor, or by the Subcontractor requesting approval. "Standard" test reports on "similar" material will not be acceptable.

B. The University and Architect reserve the right to require certification or other proof that the material, assembly, equipment or other product furnished or proposed to be furnished, for this Project is in compliance with any test or standard called for. The certificate shall be signed by a representative of the independent testing laboratory.

C. Any tests required to qualify the Contractor or any of his workmen for any phase of the work, and any test of a method, system or equipment that may be required by specification or law to qualify the item for use, shall be made or taken without cost to the University or Architect.

#### 1.5 INSPECTIONS

A. Should the specifications, Architect's instruction, laws, ordinances or any public authority require any work to be inspected or approved, the Contractor shall give timely notice of its readiness for inspection and a reasonable date fixed for such inspection. If any work requiring inspection should be covered up without approval or consent of the approving agency or the University's representatives, it must be uncovered for examination at Contractor's expense.

#### 1.6 OWNER'S INSPECTION OF FABRICATION

A. The University reserves the right to inspect the fabrication facilities and the fabrication of products for this Project. The producer shall permit such inspections and cooperate with the University to facilitate the inspections. At least 10 days prior to commencing fabrication on the following products, or others the University advises the Contractor of, the University shall be notified of the scheduled date for commencing production:

1. Miscellaneous metals, as designated by the Owner

B. The University's right to inspect the fabrication facilities and fabrication of products for the Project shall not be limited to the products listed. After notice, the University may inspect any and all facilities and product fabrication.

C. For such inspections of fabrication and fabrication facilities, the University will pay for its own travel and subsistence. The Contractor and producer shall cooperate in such inspections and make the facilities and products available on time so the University does not incur any other costs.

#### 1.7 CERTIFICATES

A. Except for test reports provided and signed by approved independent testing laboratories, all certificates required by the specification shall be signed by an authorized official of the firm providing the certificate, with the signature notarized, when such certificates by the producer are acceptable to the University.

#### 1.8 FEDERAL INSPECTION

A. The authorized representatives and agents of the Federal Government shall be permitted to inspect all Work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

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## PART 1 CONSTRUCTION HEAT, LIGHT AND POWER, WATER, TELEPHONE

1.1 TEMPORARY (CONSTRUCTION) HEAT

A. Temporary Heat: As used in this specification, temporary heat shall mean all heat required and provided during construction, whether by temporary heating units and devices, or the permanent existing or new heating system and devices, until the Project is occupied or accepted by the Owner.

B. Existing Heating System:

1. The existing heating systems shall be kept operative throughout the entire construction. Contractor shall cooperate with University personnel to effect any required modifications to systems with minimum interruption to building services.

2. In existing spaces, the University will make no charge for temporary heat. Contractor and subcontractors, however, shall not waste University furnished heat. Openings cut and windows removed during remodeling shall be provided with insulated and secure temporary closures until permanent closure is installed and sealed.

C. Heating Periods:

Period A - From start of construction under this Contract until satisfactory enclosure of the new construction with the permanent envelope; heating by temporary units or systems.

Period B - After enclosure of new construction until the work of this Contract is complete; heating by temporary units or systems as required for application and curing of paint and/or sealant systems.

D. Electrical Energy: Cost of energy for using temporary systems will be paid as specified under Article 1.2 of this Section. Electric heaters will not be permitted for temporary heat. Electrical lines furnishing temporary current to pumps and other equipment of heating system shall be adequately sized to deliver the required rate voltages and amperage to equipment.

E. Enclosure:

1. For the purpose of temporary heat, enclosure shall mean the new construction is satisfactorily enclosed as approved by the University, generally when it is to the stage of completion of: framing complete; exterior enclosure "skin"; and similar enclosure elements, are in place; roofing or other waterproof membranes complete, except for metal flashings; temporary or permanent self closing doors at the exterior and heat retention is essentially equivalent to the completed building. A few necessary openings with tightly fitted heavy and reinforced plastic (or equivalent covering) for use or passage of materials will be acceptable.

2. After the start of the heating season, the General Contractor shall provide and install approved temporary closures at lower openings. Closures

shall be substantially constructed, well fitted and maintained to prevent damage to vulnerable work, which may be damaged by penetration of cold.

3. The permanent heating system of the building is not part of this Contract.

F. Steam from University's Plant: When steam is used from the University's plant for temporary systems, it will be provided free of charge during the construction period. The Mechanical Subcontractor shall make the connections to the steam source. When steam from plant is being used, enclosure of building shall be such that steam is conserved, with consideration for adequate ventilation, as approved by the University.

G. Condensate: When steam from the plant is being used, all condensate must be piped back to the plant with none wasted. Installations by the Mechanical Subcontractor shall be made to achieve the condensate return.

H. Temporary Heating Units or Devices: All units or devices used in or adjacent to new construction, or existing buildings, are subject to approval of the University. Portable units must be vented and provide smokeless units at times and locations necessary to prevent smoke and toxic fume damage or stains to building or materials. Replace damage as directed. Temporary devices used inside the building when fully or partially enclosed shall be acceptable (smokeless and vented if oil or gas fired portable unit heaters) with motor driven fan.

I. Ventilation: During construction and particularly during painting work, and similar finishing operations, adequate ventilation shall be provided, including spaces without windows. Use power exhausts where necessary. Frosting or sweating of walls or roof will be an indication of excess humidity to be corrected. Give special attention to adequate ventilation immediately after building enclosure as well as during roofing operations (particularly in or after cold weather) to remove moisture from building. Prevent condensation in building and prevent moisture from being driven up to roofing. General Contractor shall be responsible for the ventilation.

J. Miscellaneous Requirements: Provide temporary heat such that no damage results to building, materials or installed work as may be caused by dampness, cold, thermal shock, smoke or similar damage related to heat. Maintain adequate and continuous temperatures to prevent any such damage. Keep workmen or watchmen present constantly when open fires are burning. After roof deck has been placed, or an area otherwise covered in a manner which will generally prevent snowfall in the area, the General Contractor shall immediately remove snow or ice which has accumulated within the building or unit and take closure measures to prevent further snow accumulation. Except for minor quantities and with University's approval, haul (not melt) snow and ice out of spaces.

K. Heating Period A: Unless otherwise specified, from start of construction until after enclosure, each Contractor (and Subcontractor) shall provide all necessary covering, protective devices and heating units, fuel, attendants and related heating equipment and work to completely protect his work and materials. Cost of all such protection and heating shall be borne by individual Contractors, or their subcontractors.

1. This period continues after roofing and membrane work are installed over the building or unit, until heat from the University's plant (mains) can be utilized through the temporary systems.

2. After enclosure, temporary heat within the building, or unit, shall be maintained at a minimum temperature of 45 degrees, in a reasonably uniform range, 24 hours per day, seven days per week, with heat uniformly distributed to prevent thermal shock and freezing. Provide a sufficient number of heating units at various levels, well distributed, to provide reasonably uniform temperatures.

3. Except as otherwise specified herein as a result of delays of other Contractors, the General Contractor shall provide and pay for portable heating devices, or temporary systems, as well as fuel and attendants to provide the temporary heat, after temporary or permanent enclosure until temporary steam systems are ready for use and steam is available from the University's plant (mains).

4. When new construction is framed, roof deck installed and ready for any roofing fill, insulation and membrane, the General Contractor shall provide temporary heating units, fuel and attendants within building to prevent frost on deck and to drive moisture out of and from deck. Keep building well ventilated at this time and provide sufficient heat to remove or prevent any frost on the deck (and inside building if building is enclosed). Other Contractors shall continue to protect their own work and materials as previously specified.

#### L. Heating Period B:

1. The General Contractor shall enclose the building, or unit, with the permanent construction as soon as possible. The General Contractor shall then provide temporary systems, heating units (ie: Unit heaters) and controls in the satisfactorily enclosed areas to utilize steam from the University's plant.

2. During this period, provide heat to maintain reasonably uniform temperature throughout in 50-60 degree range, 24 hours per day, seven days per week, uniformly maintained at sufficient temperatures to prevent thermal shock, or freezing, and to equalize temperatures of the materials and structure.

#### 1.2. CONSTRUCTION LIGHT AND POWER

A. Reference: Refer to Section 16010 for additional details.

B. Energy Costs and Objectives: Except as otherwise specified, the University will furnish electrical energy free to Contractor and Subcontractors throughout the construction of the Project, which is provided within the capacity of the existing and new services described in Sections 16010 and 16300, provided the privilege is not abused. However, the University will assume no responsibility or liability for power outages, or damages resulting from outages, and the Contractor shall hold the University harmless from all claims and costs from outages. Not only the conservation of energy but minimum expense to the

University are objectives, within the intent to provide good lighting conditions and adequate working conditions for high quality workmanship, as well as safety and security measures. The Contractor shall comply with University directions on the temporary installations, lighting conditions and use of energy.

C. General:

1. Except as otherwise specified, throughout construction Contractor and Subcontractors shall provide their own temporary wiring, cords, outlets, lamps, devices and connections as required. Installation, service, wiring and devices shall be safe, substantially supported and adequately connected and meet all codes. Demand shall not exceed the service and any damage resulting from misuse, faulty equipment or overloading shall be paid for by responsible persons.

2. Electric heaters shall not be used for heating unless approved by the University as the only reasonable solution.

3. Energy costs and services for cranes, hoists, large welders and similar heavy loads shall be provided and paid for by Contractor and Subcontractors requiring such service and they shall arrange for their own service and meters. Limited use of energy and service, when being paid for by the University will be permitted for loads of others for such equipment as grinders and pipe threaders provided their use does not limit the service for normal lighting and power tool loads. In the event such equipment use indicates the available service may reach capacity the Contractor and Subcontractors requiring such service shall provide their own service after being advised by the University when such condition is likely to exist.

D. Existing Service: During "down" time in any area, procedures for temporary building service specified in paragraph E, below, shall be used.

E. Temporary Building Service: As work progresses, the Electrical Subcontractor shall install the permanent service and energize the permanent secondary electrical system as soon as practicable and when approved by the University. Permanent service characteristics are specified in Section 16300.

1. The Electrical subcontractor shall provide temporary wiring, sockets and outlets for lighting and hand tools, as specified herein and in Section 16010.

2. Permanent convenience outlets shall not be used, and permanent fixtures shall not be installed until finish operations are in process but fixtures shall be installed prior to equipment installation. Other temporary wiring and devices shall be provided by each contractor as required, safe, substantially supported and adequately connected. Electrical Subcontractor shall install the permanent convenience outlets when approved by the University, just prior to occupancy.

3. For use of the temporary heating plant, and its equipment, the Electrical Subcontractor shall install all services, panels, devices and connections necessary to use the plant and system.

G. Lamps, Incandescent Bulbs and Fluorescent Tubes: Throughout the construction period, lamps in temporary lighting systems shall be provided, including replacements, by the General Contractor and installed by the Electrical Subcontractor. In general, lamps shall not be over 200 watts, except where necessary. The Electrical Contractor shall also remove and replace burned out lamps as they occur.

1. As work progresses and permanent incandescent light fixtures are used for lighting, the General Contractor shall provide the lamps and the Electrical Subcontractor shall install as specified in preceding paragraph. Just prior to final inspection the Electrical subcontractor shall remove all construction bulbs and install proper new bulbs. The University shall be advised when this replacement is being made so they may verify the installation of new bulbs.

2. In permanent fluorescent fixtures, the Electrical Subcontractor shall install new lamps as the fixtures are installed. The Electrical Subcontractor shall replace tubes as they burn out during construction and replace all burned out lamps just prior to final inspection so all lamps are good at the time of inspection.

### 1.3 SAFETY LIGHTING

A. The Contractor shall provide lighting at temporary walkways or temporary lighting at permanent walkways, constructed under this Project, until permanent lighting is installed.

B. When temporary lighting is no longer required, the Contractor shall remove the temporary facilities, at a time approved by the Owner.

### 1.4 CONSTRUCTION WATER

A. General: Contractor, and subcontractors where appropriate, shall provide their own hoses (or piping), connections and other equipment to use water, and protect their own equipment. Needless and wasteful running of water, when provided through the General Contractor's or the University's service, will not be permitted. When water is being used, the service shall be protected from freezing and damage at all times.

B. Temporary Service: During periods when water service in the existing building is shut down or is otherwise not available to accommodate the remodeling work, the General Contractor shall arrange for a source of water from hydrants or other municipal services, arrange for meter, have all connections made to provide water for use of all trades. The University will pay for water used (but not cost of meter) and the General Contractor shall consult with the University, and follow its direction, on arrangements for payment, whether directly to the City or through the Contractor. The General Contractor shall provide all connections and valves to utilize the water service, which shall include outlet connections to which other contractors may connect piping or hoses. General Contractor shall be responsible for preventing any damage to water service, including damage from freezing.

C. There is no permanent water service under this Contract.

D. The Owner will allow free use of water, provided the privilege is not abused and unnecessary running of water is prevented.



## PART 2 FIRE SAFETY

### 2.1 FIRE SAFETY DEVICES AND SYSTEM

A. General: Refer to Section 01010 for general requirements for Fire Safety Director. Contractor shall be alert to fire hazards and remove or protect against hazards and shall comply with directions of the Fire Safety Director or the University on hazards and fire safety.

B. Fire Extinguishers: Except for units in individual Contractors offices, the General Contractor shall provide and maintain adequate and proper fire extinguishing devices in and about the construction area, available for use by all workmen. The devices shall not be the units to be later installed in the Project. Appropriate devices shall be provided for the class of the potential hazard (ie. oil, electrical) at those areas where unusual hazards may exist, including in mechanical rooms. Fire hoses shall be connected to adequate sized water lines. As construction proceeds, or materials which create a hazard are moved onto various floors, extinguishing devices shall be available on each floor. The number and distribution of devices shall be adequate for effective fire control, to the satisfaction of the Fire Safety Director and the University.

C. Fire Hydrants: The area fire hydrants must be accessible at all times. Fences and construction work must be arranged and accomplished to provide immediate access to hydrants.

## PART 3 OFFICE, TOILETS, STORAGE ENCLOSURES

### 3.1 CONSTRUCTION OFFICES AND CONFERENCE SPACE

A. Contractor shall maintain an office at a designated location suitable for storing of records and for conferences. Maintain copy of Contract Documents, shop drawings, correspondence, Architect's directions. Maintain neat house-keeping. Keep separate bound files, kept neat and up-to-date. Only shop drawings accepted by Architect/Engineer shall be kept on file.

B. Contractor shall meet with University before work begins to locate office, storage areas, etc., and to coordinate work.

C. When Project nears completion, remove offices as required by Contract Documents.

### 3.2 SANITARY FACILITIES

A. Contractor shall provide temporary toilets during construction for use of all trades. Toilets shall be flushing or Satellite Service types; pit type not permitted. Toilets shall be well maintained, not create a nuisance, be screened from view. Contractor shall provide and maintain adequate supply of tissue for use of all trades. Toilet spaces in existing buildings are not to be used.

### 3.3 STORAGE

A. General: Refer to drawings for areas of storage. The Contractor (and

each subcontractor) shall provide adequate enclosures and coverings to protect and preserve all materials stored at the site. Materials such as wood, finished metal, cement, masonry materials, equipment of any type, conduit and similar materials, shall not be piled directly on ground. Any material subject to damage, deterioration or weathering when exposed shall be covered or in protective enclosures. The University reserves the right to direct such protection, which shall be complied with by the Contractor. Coverings shall be durable, watertight, fully cover sides as well as top, substantial and well anchored to prevent blowing away. Shed type of enclosures shall be provided for easily damaged and small items, shall be neatly constructed, well maintained and subject to University approval. Any protection which becomes damaged shall be replaced immediately.

1. When no longer required, the Contractor shall remove the storage enclosures, except fences.

B. Limited Area: With the extremely limited storage area, the Contractor shall carefully schedule material deliveries for immediate installation to minimize the need for storage area. Any storage structures required shall be located on the Contractor's allocation of site space. Inside existing buildings, storage is prohibited.

C. Another contractor will provide construction fence around South West Tower area as shown on drawings. Fence will become property of University and be left in place for use of JOML-A and future Contractors. Removal of this fence will be by a future Contractor.

D. A section of fencing exists near the South East Tower area (installed by B/C Contractor). This JOML-A Contractor shall add gate and new fence as shown on drawings and as specified in Article 3.4 herein. This shall become the property of the University and will be removed by the B/C Contractor.

#### 3.4 CONSTRUCTION FENCE

A. Provide new fencing, complete, with gates, as shown on drawings.

B. Maintain new and existing fences until turned over to succeeding Contractors.

C. Quality and detail shall be equivalent to U. S. Steel (Cyclone) or Page, Continental Steel or Crowley Fence Company.

D. Height shall be minimum six (6) feet.

E. Materials:

1. Fabric: ASTM A392 Diamond mesh, No. 9 gauge wire, 2" woven steel wire fencing fabric, with twisted and barbed bottom and knuckled top. Wire hot dipped galvanized after weaving, minimum zinc coating weight of 1.2 oz. per square foot (Class I coating).

2. Posts and fittings:

a. Galvanizing: Hot dipped galvanized after fabrication, minimum zinc coating in accordance with ASTM A123 and ASTM A153 as applicable.

b. Length: Provide posts of sufficient length to provide a minimum 36" setting in concrete footings, except where mounted on walls or over underground structures.

c. Intermediate or Line Posts: Provide pipe or "H" column of manufacturer's standard, minimum weight 2.70 lb. per foot, not over 10'-0" o.c.

d. Terminal Posts (ends and corners): Provide 2-1/2" or 3" pipe columns, minimum weight 3.65 lbs. per foot.

e. Gate Posts: Size and weight as per manufacturer's recommendations for gate width as indicated.

f. Post Tops: All posts shall be equipped with tops. Tubular post tops designed to exclude moisture from posts. Intermediate post tops designed to hold top rail.

g. Fittings: Cast iron or pressed steel.

3. Gates: Provide swinging hinged type of 1-1/2" (2.72 lbs. per foot weight) steel pipe frame, complete with welded fittings, torsion bars, hinges, truss rods, positive type latching device with provision for padlocking, center plunger rod, catch and semi-automatic outer catch to secure gate in opened position.

4. Top Rail: 1-5/8" o.d. steel pipe 1.8 lbs. per foot. Provide with couplings every 20 feet. Top rail to pass through intermediate post tops and form a continuous brace from end to end of each stretch of fence. Fasten to terminal posts with steel connections.

5. Braces: At terminal posts as per manufacturer's recommendations for secure, rigid installation.

6. Tension Wire: No. 7 gauge coated spring coil tension wire. Coating as specified for fabric.

#### E. Erection:

1. Erect in rigid, substantial manner, level and plumb in strict accordance with manufacturer's installation instruction. Set all posts in concrete footings.

2. Confirm locations of all underground structures and utilities before excavating post holes. Do not proceed if interference exists. Obtain University approval of any adjustments in location of fence or components.

3. Provide all bracing, guying and other incidentals to provide permanent fence.

### PART 4 MISCELLANEOUS PROVISIONS

#### 4.1 PARKING AND LOADING - UNLOADING

A. General: All campus regulations, signs and directions regarding parking and loading - unloading shall be followed. The Contractor is responsible to

instruct his workmen. For unusual conditions, the Contractor shall consult with the University on proposed procedures and locations, should a temporary variance be required, and follow the instructions issued.

B. Absolute Zones: All zones which are marked NO PARKING - NO STOPPING ANY TIME, must be strictly adhered to. All deliveries and pickups by contractors, subcontractors and suppliers must be made on side streets, alleys, or on University driveways and loading zones.

C. Parking is available for cars of contractors' foreman and workmen working on campus in University parking lots at regular parking rates.

#### 4.2 TEMPORARY CLOSURES AT EXISTING BUILDINGS

A. The General Contractor shall provide neat and approved temporary closures wherever work of this Project interfaces with existing buildings or spaces. In general, closures shall be partition types (not canvas or similar material), with doors or access between the spaces only as required. Surfaces facing adjacent finished or occupied spaces shall have equivalent of gypsum board surface, smooth and undamaged. Temporary closures shall be located as approved by the University, with minimum encroachment on the existing spaces. Closures shall not block required exits nor unduly restrict circulation or activities in the adjacent space. The Contractor shall provide a schedule to the University, on a floor-by-floor and location-by-location basis when areas need to be vacated to install closures, or when areas will be closed off.

B. Temporary closures shall provide security from passage between the spaces (new spaces and existing space remaining in use by University), as well as provide protection from weather and from the transfer of dust. When any closure will be exposed to weather from November to April, it shall be insulated with 3" minimum blanket insulation. Perimeters and penetrations shall be sealed with masking tape, caulk or other appropriate seal to eliminate passage of air and dust. Closures shall be well maintained to protect against weather, dust and to provide security.

C. Painting of surfaces facing adjacent finished or occupied spaces will be done by the University, if required.

D. At a time agreed upon by the University and Contractor, temporary closures shall be removed and all permanent surfaces cleaned and restored by the Contractor.

#### 4.3 SIGNS

A. Job Sign: Custom job sign not required.

B. Office Sign: Contractor may provide a sign to identify his office and directional signs from nearest main street to project area; professional lettered signs only.

C. No other signs permitted, including signs on structure.

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## PART 1: GENERAL

1.1 GENERAL REQUIREMENTS

A. The nature of the Project, the schedule of substantial completion and final completion as specified in Section 01200, the time necessary for the University to complete future Projects of the Jackson Owre Millard Lyon Complex Remodeling requires careful and efficient planning to facilitate an orderly completion process within a short period of time. The Contractor shall organize and schedule a coordinated completion process and prosecute the work efficiently and diligently. The Contractor shall organize and schedule the work of subcontractors, as well as his own work, obtain firm commitments from subcontractors on completion of their work and coordinate his effort with all other Contractors and the University to achieve completion on time.

B. As applicable, the specified requirements shall apply to substantial completion specified in Section 01200. Where appropriate or possible, the specified requirements shall be accomplished on or before the date of substantial completion.

C. After substantial completion, the Contractor shall continue to diligently prosecute all remaining work in an organized, efficient manner.

D. As may be appropriate, the requirements of this section apply to, and shall be accomplished for any individual area, floors, spaces or other parts of the total Project which the University may take over and assume beneficial occupancy or use.

## PART 2: PROJECT CLOSE OUT

2.1 REQUIREMENTS SPECIFIED ELSEWHERE

A. Insurance: Refer to General Conditions, Article II.

1. Upon completion of last phase of the work and final payment, provide a certificate of insurance that indicates the specified Completed Operations Insurance will be provided a minimum of one year after the University's acceptance of the entire Project.

2. The specified Property Insurance (Multiple Peril Builder's Risk) may be cancelled at a time approved by the University after occupancy of the entire project by the University, or upon final completion and final acceptance by the University of the entire Project, whichever occurs first.

B. Change Orders: All Change Orders shall be resolved prior to final payment, including the adjustment of any allowances.

C. Consent of Surety: Refer to General Conditions, Sub-Paragraph 9.7.1. The consent of the Surety must be obtained prior to any reduction in retained percentage and prior to final payment.

D. State Income Tax Withholding Certificate: Refer to General Conditions, Sub-Paragraph 9.7.2.

E. Guarantees - Warranties: Refer to General Conditions, Sub-Paragraph 13.2.2 for the general guarantee requirements.

1. In addition to the general guarantee, provide all written guarantees specified in the technical Sections of the specifications. Where the guarantee terms are included in the specifications (i.e.: Section 07510) or a specific guarantee is referenced, submit guarantee in the specified form. Submit guarantees at substantial completion. The Contractor shall provide a check list of required guarantees, by Section numbers.

F. Test Reports and Certificates: Provide all test reports and certificates required in the Technical Sections, prior to final payment. The Contractor shall provide a check list of required reports and certificates, by specification Sections.

G. Retention of Records: Retain all records as required by law and good business practice.

H. Record Set of Drawings: Refer to Section 01300, Article 2.5. Deliver the record set to the University upon final completion of the Project. Review the set with designated personnel of the University, to clarify or explain changes that may be necessary. Obtain a receipt for the set.

I. Temporary Utilities: Refer to Section 01500:

1. Remove all temporary facilities and utilities as the job progress permits. Read all meters at the times specified for the transfer of services cost from the Contractor to the University, as applicable.

2. The Contractor shall pay the University for all charges for utilities (except those paid directly to the utility company) he is responsible for, prior to final payment on the Contract to the University.

J. Sanitary Facilities: Refer to Section 01500, Article 3.2. Remove temporary toilets and restore the area as specified, prior to substantial completion of final phase.

K. Elevators: Refer to Section 01500, Article 4.4.

1. At a time approved by the University, the Contractor shall remove all protective linings provided by him in elevators that have been in temporary use and shall restore the elevators, as required to return them to existing condition. It is intended this work be accomplished just prior to final completion of the entire Project.

L. Temporary Facilities:

1. As the job progresses and facilities are no longer needed, they shall be removed by the Contractors, at a time approved by the University.

2. Prior to final payment, the Contractors shall remove all temporary sheds, offices, fences (except as specified in Section 01500), barricades, surplus materials, debris and other materials or items not part of the Project.

M. Extra Materials: Prior to final completion, deliver all extra materials specified in the various technical sections. These materials shall not be allowed to "collect" in various parts of the Project, but shall be delivered to the designated representatives of the University, as directed. Obtain receipt for the specified extra materials and without such evidence of delivery, no credit will be given for fulfilling the specified requirements. The Contractor shall provide a check list of the specified extra materials.

N. Construction Cores and Keys: At the time of substantial completion, just prior to occupancy, the University will replace the construction cores and install the permanent cores in the locks. Thereafter, access to the spaces will be by having the University open the doors.

O. Identification of Equipment: Prior to substantial completion, the Contractor shall provide the identification tags or plates, or other identification means, as specified under the technical Sections of the specifications, such as at valves, panelboards and similar items. Plates with directions, circuit data and similar information shall also be affixed.

## 2.2 SYSTEMS AND EQUIPMENT TESTING

A. The Contractors are responsible for testing all equipment and systems of their contract and demonstrating they are correctly installed and operating properly, in the intended and planned manner. The Contractors shall operate and test each system and provide a written record of the tests and the results.

## 2.3 CLEAN-UP

A. Refer to General Conditions, Article 4.16, and Section 01010, Article 1.25 for general requirements of cleaning during construction. Unless otherwise specified, each subcontractor shall be responsible for cleaning the materials and equipment of his subcontract, as well as the removal (hauling away) of all his own debris, cartons, crates, surplus materials and maintaining his work neat and orderly under the general direction of the General Contractor.

B. It is intended the general "final" cleaning of all areas affected by the work of the Project be accomplished just prior to the inspection for substantial completion and occupancy, typically within the week prior to the inspection. Cleaning shall be a planned, organized effort to avoid working in spaces after they have been cleaned. The General Contractor shall schedule the cleaning sequence, in cooperation with subcontractors and other Contractors and all shall schedule their operations to conform to the cleaning plan. In general, the mechanical and electrical subcontractors shall perform their cleaning and debris removal from the spaces first, with the General Contractor last.

C. The following requirements are a general guide to the required cleaning; do not construe as a complete description of all the cleaning required, as the work of the entire Project shall be thoroughly cleaned, including any specific cleaning required under other sections. As an area is cleaned, each Contractor shall remove the accumulated dust, dirt and debris.

D. The electrical subcontractor shall clean the interiors of cabinets, panelboards and other equipment provided under his Contract, and clean light fixtures which have become dusty and lenses which are dirty.

E. The mechanical subcontractor shall: clean any ductwork that has become dirty or dusty; clean all fixtures and fittings; clean any dirty or dusty radiation; dust and clean piping and equipment and clean other work.

F. Tunnels, shafts, air shafts, air plenums (not ductwork) and similar areas where work has taken place, shall be free of dust and dirt. General Contractor shall clean these areas to "broom clean" condition.

G. At all spaces of this contract the General Contractor shall clean the spaces to "broom clean" condition, except that floors shall be washed and new floors shall be given the final coat of seal specified under Section 03300.

H. At contiguous normally occupied areas, such as classrooms, laboratories, service areas, passages and corridors and similar spaces, the General Contractor shall: clean all his work to the "thoroughly clean" condition previously specified; provide floors (including concrete) that are free of stains and discoloration; adjust hardware and polish any that has become discolored; and perform such other cleaning as required to turn the Project and its spaces over to the University in a new, well maintained building condition, ready for full use and occupancy.

I. At spaces with bare concrete floors, the floors shall be washed and be given the final coat of seal, specified under Section 03300, just prior to final inspection or occupancy of the space.

J. After cleaning for inspection for substantial completion and occupancy, any subsequent work in any space shall likewise be cleaned upon the completion of the work by the Contractor or subcontractor, as above.

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## PART 1: GENERAL

1.1 SCOPE

- A. Conditions of Contract and Division 1 General Requirements apply to all work of this Section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.
- B. Refer to Sections 01010, 01200, and 01500 for special requirements, protection, constraints, timing of work, scheduling of work, enclosures and similar requirements relating to this Section.
- C. This Section covers cutting, demolition, removal work, patching and restoration of work as necessary to accomplish and complete all work under the Contract, including and relocation or reuse of existing materials, equipment, systems or other work, as well as the disposition of salvaged materials or debris. This Section governs all Subcontracts and trades.
- D. It is the intent that, unless otherwise specifically shown on the drawings or specified, each subcontractor shall be responsible for all cutting, demolition, removal, patching or restoration as may be required to complete his work, under the general direction of the General Contractor.
- E. Except for general demolition of entire areas it is the intent that at each area, or space, each subcontractor shall make the removals, perform demolition and accomplish relocations of work normal to his trade (ie: Mechanical subcontractor removes or relocates piping, ductwork and similar; Electrical subcontractor removes or relocates panelboards, conduit, lighting and similar). At areas of general demolition of the entire spaces, the Mechanical and Electrical shall make removals of work normal to their Contract or may be called for, for reuse or relocation, make any necessary relocations and cut-off, terminate, cap or otherwise discontinue services that will be abandoned or removed in the space. The General Contractor shall then demolish or remove all abandoned or unwanted electrical or mechanical materials, items or elements in the area.
- F. All work under this section shall be coordinated with the other Contractors and the University and shall be accomplished at times acceptable to the University.

## PART 2: DISPOSITION OF MATERIALS

2.1 UNSALVABLE MATERIALS

- A. All unsalvable materials shall be removed in a manner that will avoid damage to materials or equipment to remain and shall be completely removed and legally disposed away from the site.

2.2 SALVABLE MATERIALS TO BE RE-USED IN THE WORK

- A. Salvable materials designated for re-use or relocation shall be removed

by the applicable trades, stored (off site if required), and protected from damage until they are incorporated into the new work.

B. Carefully remove, salvage, clean and preserve materials and equipment indicated to be reused or needed for reuse to match existing work. Exercise extreme care in removals to prevent damage or to make materials unsuitable for reuse. For materials shown or called for to be reused and which are damaged, replace with equivalent and matching work.

C. Exercise extreme care in removing brick or stone from existing building to preserve for reuse. Do not reuse broken brick. After removal clean all mortar from all sides of brick, carefully stockpile and protect to insure brick is available for reuse. Stockpile off site, if space is not available at site, and cover and otherwise protect from soil or damage. Stockpile on suitable platforms (not on earth).

### 2.3 SALVABLE MATERIALS TO BE STORED FOR THE UNIVERSITY

A. All salvable materials not designated for reuse in the work are hereby designated to remain the property of the University. These shall be carefully removed by the applicable trades, protected from damage and stored as directed on the site until removed by the University.

B. Consult the University for any salvage the University may wish to retain and the salvagability of all items. Carefully remove and salvage any materials the University wishes to retain. Remove finish hardware from the item or material taken out of the building and turn over to University. Cleaning or restoration of the University's salvage materials is not required.

C. Removal from the site storage to University storage will be by the University.

## PART 3: EXECUTION

### 3.1 TEMPORARY PROTECTION

A. Provide temporary bracing, shoring, needling and support during demolition, cutting, remodeling and related new construction as necessary for the execution of the Work and the protection of persons and property. Perform all work with appropriate supports, protection and methods to prevent collapse, settling or damage to property or persons. Provide adequate supports for the loads to be carried, with loads properly distributed including to lower levels, if necessary.

B. Provide protective coverings and enclosures necessary to prevent damage to existing spaces and materials to remain. Protect openings in exterior walls and roofs (including removal of roofing and flashing) so as to prevent damage from water and the elements and prevent excessive heat loss from the existing buildings.

C. Refer to Article 4.2 of Section 01500. Provide dust-proof temporary enclosures separating areas under demolition and remodeling from the remainder of the building. Provide temporary hinged doors in temporary enclosures where necessary. Temporary and permanent doors shall be completely sealed with tape or other suitable material during demolition work and shall remain sealed until dust has settled.

### 3.2 GENERAL REQUIREMENTS

A. Accomplish all work of cutting, removal, demolition, patching or other restoration using only mechanics skilled in the trade. If necessary, sublet the work to skilled contractors or subcontractors.

### 3.3 DEMOLITION AND CUTTING

A. Demolish and remove existing construction as shown, indicated or required to be removed. Where new Work is to be installed in or adjacent to existing construction or existing work is to be replaced, remove or cut the existing construction as necessary to complete the Work of the Project.

B. Execute work with care. Existing construction that is to remain which is loosened, cracked, or otherwise damaged or defaced as a result of the Work and is unsuitable for use intended shall be removed and replaced at no additional cost to the University.

C. Clean demolition areas and remove debris, waste and rubbish from the building at the conclusion of each day's work. Transport debris and rubbish in such a manner so as to prevent spread of dust.

D. Debris from upper levels shall be transported to ground in covered chute or other approved means. No free-fall debris removal is permitted. Moisten debris with spray where practical. Take all precautions to minimize dust. Promptly remove debris from site as demolition progresses and debris accumulates. Do not store or permit debris storage at site. Do not burn debris, rubbish or waste at the site. Keep adjacent areas unencumbered and clean. Keep walks and similar areas broom clean.

### 3.4 PATCHING, REMODELING AND RESTORATION

A. Patch or otherwise restore disturbed existing construction as indicated on the drawings, or as otherwise required to restore the work and surfaces. Patching or restoration shall be carried to natural breaks (ie: corners) wherever reasonable. Where existing construction is removed, cut, exposed or otherwise disturbed by Work of the Project, patch defective and incomplete surfaces. Repair any damage to existing construction which is to remain.

B. Patching work shall be done by skilled mechanics experienced in the particular type of work involved. Patching work shall conform to the standards of the Specifications where applicable, and where not specified, work shall conform to the highest standards of the trade.

C. Patch existing construction to match existing work (unless otherwise called for) except provide new materials and accomplish as for new work. Examine existing surfaces to be patched before proceeding with the work. Report all conditions where existing materials, colors and finishes cannot be matched to the University, and do not proceed until the University has issued instructions.

D. Existing construction that has been damaged as a result of the Work shall be repaired to an extent and as required to match adjacent existing undamaged construction.

E. Thoroughly clean and prepare all surfaces to receive new finish or covering. Completely remove dirt, dust, grease, oil, paint, loose materials and soil. Clean, etch where necessary, and place surfaces in most suitable condition for the finish, as approved by University.

### 3.5 MECHANICAL AND ELECTRICAL WORK EXPOSED

A. Where unknown mechanical piping or electrical conduit is exposed during removal of partitions or walls, removal or rerouting shall be accomplished by the Mechanical or Electrical subcontractor as applicable. Rerouted piping shall be located where directed and shall be connected to maintain all functions in proper operation. Abandoned piping may be left in place where it is concealed in floors or walls, providing that it is disconnected from its source. There shall be no "dead end" water, sewer, or vent piping existing in the completed work.

B. Removals, capping or otherwise terminating services which are abandoned shall be accomplished without additional cost to the University. Relocations and rerouting of services that were unknown shall be paid for as Changes in the Work.

### 3.6 WORK OF EACH CONTRACT

A. Each Subcontractor shall carefully review the Contract Documents including for other trades, with respect to the coordination of the demolition, removal and remodeling work and perform such removals normal to their Contract as may be shown, noted or otherwise required. Cutting and patching incidental to demolition, removal and or remodeling of general construction work shall be construed as the work of another trade when specifically noted or called for on documents primarily for another trade, or the cutting and patching is done solely to accomplish work of another trade. Mechanical and Electrical subcontractors shall perform their own cutting and patching to accomplish their work unless indicated on Architectural drawings as being done by the General Contractor.

### 3.8 PAINTING

A. Mechanical or Electrical Subcontractor shall be responsible for painting or repainting of patched or remodeled areas where he has performed work, except for those areas shown or required to be remodeled under the General Contract, in which case the new, patched and remodeled paintable surfaces shall be repainted by the General Contractor. It is the intent the Mechanical and Electrical Subcontractors paint or repaint surfaces at locations where demolition, cutting and patching is accomplished only for their work.

B. Painting, including preparation, materials, workmanship and number of coats shall comply with Section 09900. Painting of surfaces patched shall extend to natural breaks, such as corners, as approved by the University.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes all earthwork required by the Construction Documents within the defined construction limits as well as outside the construction limits as may be required to accomplish all phases of work under the Contract. The following broadly outlines the intent of work under this section; do not construe as describing all phases, operations, details, methods or requirements. Perform, provide and accomplish all similar and related items to complete the work.

1. Removal and disposal of excavated materials which are excess or not suitable for fill or backfill.

2. Earth excavation required for construction and site development including excavations for foundations.

3. Backfilling and compacting against footings and walls.

4. Placing and compacting of fills, backfills and cushions.

5. Grading of excavations and site within the construction limits.

6. Grading of temporary drives for excavation operations.

7. Protection of buildings, structures, streets, paving, curbs, manholes, walks, utilities and underground services and other new or existing items to remain from damage.

8. Provide to site all materials of kinds required to accomplish work shown and specified, unless available at the site.

9. Removal and disposal of underground sewer and appurtenance to be replaced.

C. Work excluded from this Section:

1. All grades shown on the site plan are "finish" grades. Work under this Contract includes rough grading to levels that are 8 inches below the "finish" grades shown or to finish grade as noted. Finish grading, landscaping and the installation of surfacing materials will be included in future contracts.

D. Related work specified elsewhere:

1. Demolition and Removal Work: 01910.
2. Cast-in-Place Concrete: Section 03300.

## 1.2 CONDITIONS AT THE SITE

A. Bidders shall completely familiarize themselves with the site and the drawings. No extra compensation will be allowed for unforeseen conditions that can be determined from a careful examination of the site, drawings and specifications.

## 1.3 TESTING

A. The Owner will retain the services of qualified engineers employed by an independent testing laboratory to analyze the soils and to perform tests, report findings and determine whether the required soil values are obtained.

B. The Contractor shall extend full cooperation to these engineers in obtaining samples for field and laboratory use.

## 1.4 INSPECTIONS AND APPROVAL

A. The methods of excavation shall be subject to the approval of the Owner and Architect.

B. The final conditions at the bottoms of the excavations will be inspected by the Owner and testing laboratory. Tests shall be made where necessary. Approval of conditions found must be obtained from the Owner before forms, reinforcement and concrete are placed.

C. All protective measures to be provided to prevent disturbance of existing soil supported structures, to prevent bearing failure of soils under existing foundations and to support and protect the existing electrical ducts shall be subject to review and approval by the Owner and Architect before proceeding.

## PART 2: MATERIALS

### 2.1 EARTHWORK MATERIALS

A. Granular fill and backfill. Reasonably well graded pit run granular materials, sand or sand-gravel, clean course and sharp in character, free of debris, cobbles and boulders, free of clay and silt, free of organic material or other material which will prevent compaction. Use material classified under ASTM D2487-69 and D2488-69 as SW, SP, GW, GP or GM-SM. Suitable material from site may be used after analysis and classification by soil laboratory. Use for:

1. General fill and backfill within buildings, including "bulk" fill.
2. Backfill at foundations interior and exterior.

B. Gravel Cushion: Use as a free draining cushion under basement floor. Gravel cushion to be in accordance with the 1968 Minnesota Standard Specifications for Highway Construction, Section 2502.2, Subdrainage Backfill.

C. Site Fill: For general fill at site use best classes of materials available at the site, using coarse grained soils as far as possible and avoiding use of silty and other poor soils. Use fill material free from debris and organic matter. Use for general site fill at unsurfaced areas.

D. Laboratory tests on types of materials to be used for general fill and backfill and granular cushion will be provided by the Soils Engineer, retained by the Owner in accordance with Article 1.3 and 3.4. Two tests to be provided for each type of soil. Contractor shall consult with the Soils Engineer, who shall make a recommendation of optimum moisture content, method of providing this moisture and methods of compaction for each type of fill. Contractor shall moisten or dry out fill and provide and accomplish compaction as recommended by laboratory. Copies of tests shall be provided to Architect, University and Contractor.

## 2.2 THICKNESS OF MATERIAL

A. Gravel cushion under interior ramp and floor slabs on grade: 8".

## PART 3: EXECUTION

### 3.1 SITE CLEARANCE

A. Remove all debris and legally dispose away from the site. Where debris is mixed with soil, both the soil and the debris shall be removed. Protect existing adjacent buildings, trees, shrubs, and areas, features, and property. Replace any sidewalks, curb, gutter and other structures broken as result of operations under this Contract which are to remain.

B. At the start of operations, strip topsoil at areas to be disturbed within the construction limits by approved methods and legally dispose away from the site. Topsoil outside the construction limits shall remain. Disturbed site areas outside of the construction limits shall be leveled and dressed to a finished grade appearance.

### 3.2 EXCAVATION AND TEST HOLES

A. Plan Grades: All new grades shown on the site plan are "Finish" grades. Grades at points between spot elevations or contours are to be determined by interpolation between given grades or elevations. (See Article 3.3.E, Grading).

B. Soil Excavation:

1. Perform no excavation adjacent to existing features until proper precautions or protection have been provided or will be provided as excavations progress. Immediately replace any damage and restore services.

2. Excavate so that column and load-bearing wall footings bear on sound, undisturbed, natural soils. Excavate down through any fill, black colored topsoil and loose silty layers as required to provide proper bearing and prevent differential settlement.

3. Appreciable changes in footing elevations (up or down) will be adjusted by change order (credit or extra) to Contract. After footing

excavation has been made to proper depth, make 3" diameter borings at least 3 feet deep where directed, for examination of soils. Provide a boring approximately at the center of each column footing, at approximately mid-length below footings for bearing walls less than 30 feet long and borings at spacings not to exceed 30 feet on centers below footings of continuous bearing walls exceeding 30 feet in length.

Test hole borings shall be made by Contractor and the samples taken shall be laid alongside each test hole. All test hole boring samples shall be examined by testing laboratory.

4. Within areas of building, walks and concrete or bituminous paved areas, excavate and remove all black soils, soil with organic content, fill materials or soft soil materials as may be found which are unsuitable for loads. No footings or similar loads are to bear on fill or soil with inadequate bearing capacity.

5. Excavate to lines, levels, dimensions shown and required with allowances for slabs, footings, cushions and other features. Hand excavate lower levels (at least 10") of footing and trench excavations and work adjacent to existing utilities, pipes, electrical duct, and buildings.

6. Keep footing trenches level and free of loose dirt, debris or water. Provide excavations for footings and walls wide enough to accommodate forms as all concrete shall be formed.

7. Remove all frost from ground such that no building feature is placed on frozen ground.

8. Overcut footing excavations shall require that the footing concrete be placed for the full depth of the overcut, at no additional cost to the Owner.

C. Excavated Material: Excavated material, if suitable as determined by Soil Testing Laboratory, shall be retained on the site for use as described under Article 2.1. All unsuitable material and other excess earthwork materials shall become the property of the Contractor and shall be disposed by him off the limits of the University at no further cost to the Owner. Conduct operations such that excavation material and material used for fill shall not be subject to erosion and the Contractor shall be responsible for any damage to adjacent properties, because of erosion, or diversion of surface water drainage.

D. Water:

1. All footing excavations must be kept free of surface water by grading the surface adjacent to the excavation to divert water.

2. Provide pumping of water to keep excavations free of water, including time of placing and curing concrete and compaction or other work subject to water damage.

### 3.3 BACKFILLING

A. Backfilling Methods:



1. All excavated areas of the site shall be thoroughly cleaned of all debris before backfill operations are begun.

2. All backfill material shall be in accordance with Article 2.1.

3. Backfill shall be placed on subgrades in uniform, successive layers approximately 6" in compacted thickness. Each layer shall be level, smooth and thoroughly compacted by appropriate means over the entire surface before placing successive layers.

4. Embankments shall not be constructed during periods when the soil will freeze while being placed and compacted, nor shall any embankment material be placed on soil that is frozen. Frozen soil shall not be placed in embankments. All embankments more than 2 feet in thickness shall be compacted by mechanical means.

5. The Contractor shall provide the necessary vibratory or rolling equipment to obtain the required compaction.

6. Compaction by grading equipment shall not be considered adequate for uniform compaction.

7. Small vibratory or hand tamping compactors shall be required wherever fill or backfill is placed adjacent to walls or around footings and columns.

8. Where fill or backfill materials are placed on both sides of walls, they shall be placed in layers alternately on opposite sides of the walls to maintain levels that will avoid displacement of, or damage to, the walls.

9. Where fill or backfill materials are placed on one side of a wall the wall shall be adequately shored and braced or the material shall not be placed until the supporting floor slab has been poured and set.

10. Any trenches dug in the compacted fill or backfill materials shall be backfilled firmly in uniform layers not exceeding eight inches in loose depth with each layer being compacted with a small vibratory or hand tamping compactor to the density specified in Article 3.4.

11. Fills and backfills shall be formed and maintained to provide proper drainage.

12. The finished subgrade surfaces shall be reasonably smooth, compacted and free from irregular surface changes.

13. Where excavation to proper subgrade exposes unstable soil, remove the unstable materials and replace with satisfactory materials as directed by the Supervising Engineer, except at soils located below footings. In the event unstable soils are found to exist below footing locations, the Testing Laboratory, Owner and Architect will direct the procedures to follow.

B. Drainage: As necessary during the progress of work, provide adequate temporary drainage facilities that will prevent erosion damage or unnecessary delay of the work, and shall restore original drainage as soon as the work will

permit. Provide and maintain drainage away from any building or work area during the construction period.

C. Removal of Water: Dispose of any water entering the excavation and at all times maintain the excavation in a clean and dry condition. Provide sufficient storm water drainage, construct temporary sumps as required and pump to permanent drainage structures on or off the site. Water shall not be conducted onto adjacent property.

D. Inspections:

1. The Owner and Testing Laboratory will inspect all excavations and the soils removed from the borings as specified under Article 3.2 B3.

2. The Testing Laboratory will perform any additional field and laboratory tests and inspections required on the natural soils at the bottoms of the footing excavations to verify the load bearing capacity of these soils as required and specified in Article 3.4 A8.

3. The Contractor shall not proceed with the construction of footing forms until the existing soils at the bottom of the excavations have been inspected and tested as necessary and permission to proceed has been given by the Owner.

4. Laboratory tests (sieve analysis, density tests, etc.) of the fill, backfill and gravel cushion materials and the methods of compaction must be accepted by the University before starting work.

E. Grading:

1. All grades shown on the site plan are finish grades. All grading shall be worked such that smooth contours will result and that the subgrade shall be reasonably smooth and free from lumps, boulders, branches, etc. Hand level around all obstructions.

2. Rough grading to levels 8 inches below the finish elevations shown is included under this Contract.

3.4 FIELD AND LABORATORY TESTS

A. Laboratory and field testing of soils prior to and during excavation, filling backfilling and compaction operations shall be done in accordance with the following:

1. The Owner shall retain an independent testing laboratory which shall provide inspection of excavations, soils evaluation tests and soil density tests.

2. Tests of compacted fills and/or backfills shall be made every second layer and at intervals of not over 30'-0" center to center in both directions of the areas of fills and/or backfills to assure compliance with these specifications.

3. The independent testing laboratory shall submit to the Owner, in triplicate, plus a copy to the Architect and Contractor, complete written reports of all inspections and tests performed as soon as practical after they are made.

4. No fill or backfill materials shall be placed until the necessary tests have been made and approval obtained from the Owner.

5. Field Density Tests of the compacted fills and/or backfills shall be performed in accordance with ASTM D1556.

6. All material to be used for granular fill, backfill and gravel cushion shall be tested by mechanical analysis (AASHTO) to determine conformance with specifications.

7. Compaction of the following shall meet or exceed the following percentages of Proctor Density (ASTM D698):

- 96% for: All fill and backfill within building; backfill against building foundations and other backfill and cushions under all concrete slabs (interior or exterior); all backfill within 25 feet of building.

- 92% for: General site fill which is more than 25 feet from building and not under slabs or paved areas.

8. In addition to the above, all natural, undisturbed soils below footings and foundations shall be verified in writing by the soil testing laboratory as having a minimum design bearing capacity value of 5000 pounds per sq. ft. to meet footing and foundation design requirements. In the event that the natural undisturbed soils do not have the required design bearing capacity the Testing Laboratory, Owner and Architect will determine the procedures to follow for the installation of the footings and foundations.

B. If tests indicate that the materials specified have not been furnished, placed and compacted in compliance with these specifications, the materials shall be removed, replaced, recompact and retested and the entire cost of this additional work, including the costs of the retests, shall be paid for by the Contractor.

### 3.5 PROSECUTION AND CLEAN-UP

A. Be aware of and comply with work priorities outlined in these specifications and other adjustments in work schedule, as may be required to properly coordinate the construction work with other Contractors or the Owner's requirements.

B. Leave the site in an orderly condition free of all debris. All areas outside the Contract limits which have been disturbed shall be restored to their original condition.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all formwork for cast-in-place concrete.

C. Related work specified elsewhere:

1. Concrete Reinforcements: Section 03200.
2. Cast-in-Place Concrete: Section 03300.
3. Structural Steel: Section 05120.
4. Metal Fabrications: Section 05500.

1.2 REFERENCE STANDARDS

A. American Concrete Institute, (ACI), ACI 347-68, "Recommended Practice for Concrete Formwork."

B. ACI 301-72, "Specifications for Structural Concrete for Buildings."

C. ACI 318-71, "Building Code Requirements for Reinforced Concrete".

## PART 2: PRODUCTS

2.1 MATERIALS

A. Construct forms of wood, metal or other material to the following requirements.

B. For exposed concrete, use BB Plyform Class I or II Exterior, HD Overlay Plyform Class I or II Exterior, Exterior Plyron with smooth tempered hardboard faces or ¼" thick Tempered Presdwood Masonite form liners, free of torn grain, worn edges, hole patches or other defects.

C. Metal forms may be used, upon approval of the Owner and Architect, and shall produce surfaces equal to those of wood forms specified.

D. Sound boards, plank or metal forms may be used where concrete is not exposed, except structural slabs shall be formed with plywood.

E. Suitable moldings or chamfer strips shall be placed in the corners of column, beam and wall forms where the concrete will be exposed to view. Refer to architectural drawings.

F. Positive means of adjustment (wedges or jacks) of shores and struts shall be provided.

G. Form Oil: Non-staining paraffin-based meeting Federal Specification P-0-361.

H. Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be a commercially manufactured type. Nonfabricated wire is not acceptable. The portion remaining within the concrete shall leave no metal within one inch of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed one inch diameter. Ties for walls below grade shall be snap ties or have cones and shall incorporate a water-seal washer.

I. Plastic pipe: Fabricate to proper length and cut angles from Schedule 40 PVC pipe as manufactured by Cabot Corporation or approved equal. Remove burrs and sand cut ends smooth but maintain flush square edge at outside of pipe. Set firmly in form to hold pipe end flush with concrete and avoid displacement in concreting.

J. PVC Waterstop: Sonneborn-Contech Hydrocide Vinylstop 43165 or equivalent of Williams Products Company or W.R. Meadows, Inc., or approved equal.

### PART 3: EXECUTION

#### 3.1 REMOVABLE FORMWORK

A. Construction: Construct forms to shapes, lines and dimensions called for on drawings, true to line, plumb and level, with joints mortar tight. Provide proper bracing and supports of sufficient strength to carry, without appreciable deflection and with absolute safety, the dead load of concrete as a liquid together with live loads of men, equipment and materials.

1. Provide sufficient forms so that work can be carried out without delay. Build forms of material of sufficient strength to hold concrete without bulging or sagging between supports. For concrete to be exposed to the weather, the edges shall be glued or otherwise sealed to prevent loss of any of the matrix. Edges of form panels in contact with concrete shall be flush within 1/16" and forms for plane surfaces shall be such that the concrete will be plane within 1/16" in four (4) feet.

2. Construct forms with proper camber resulting in level construction when the concrete has been placed in the forms.

3. Construct forms for exposed concrete with particular care to avoid appreciable deflection and to eliminate bulges, offsets or other unsightly features in the finished surfaces.

4. Design forms so they may be removed in the proper sequence and without damage to the concrete.

5. Provide side forms for beams and slabs which are removable without

disturbing the bottom forms or the shoring beneath them.

6. Provide satisfactory foundations for formwork supported on the ground to carry the loads imposed during and after construction, without appreciable settlement.

7. Adjust shores and struts to take up all settlement during concrete placing operations.

8. Forms for walls and columns shall have removable panels where required for cleaning, inspection and application of bonding paste.

9. Design and construct formwork to insure that concrete surfaces will conform to the following tolerances.

- a. Variation from the plumb:
  - 1. In the lines and surfaces of columns, piers and walls:
    - In any 10 feet of length - - - - - 1/4 in.
    - In any story or 20 feet maximum - - - - - 3/8 in.
    - Maximum for entire length - - - - - 1 in.
  - 2. For exposed corners, control-joint grooves and other conspicuous lines:
    - In any bay or 20 foot length - - - - - 1/4 in.
    - Maximum for entire length - - - - - 1/2 in.
- b. Variation from the level or from the grades indicated on the drawings:
  - In slab and beam soffits:
    - In any 10 feet - - - - - 1/4 in.
    - In any bay or 20 foot length - - - - - 3/8 in.
    - Maximum for entire length - - - - - 3/4 in.
- c. Variation of the linear building lines from established position in plan and related position of columns, walls & partitions.
  - In any bay or 20 foot length -- - - - - 1/2 in.
  - Maximum for entire length - - - - - 1 in.
- d. Variation in the size and locations of sleeves, floor openings and wall openings - - - - - + or - 1/4 in.
- e. Variation in cross-section dimensions of columns and beams and in the thickness of slabs and walls:
  - Minus - - - - - 1/4 in.
  - Plus - - - - - 1/2 in.
- f. Footings:
  - 1. Variations in dimension in plan
    - Minus - - - - - 1/2 in.
    - Plus - - - - - 2 in.
  - 2. Misplacement or eccentricity

- 2% of the footing width in the direction of misplacement  
but not more than - - - - - 2 in.
- 3. Reduction in thickness  
Minus - - - - - 5% of specified thickness

g. Variation in steps

- 1. In a flight of stairs  
Rise - - - - - + or -1/8 in.  
Tread - - - - - + or -1/4 in.
- 2. In consecutive steps  
Rise - - - - - + or -1/16in.  
Tread - - - - - + or -1/8 in.

B. Soil Supported Forms: If soil supporting forms is not suitable to carry loads imposed without compressing, provide trussed supports.

C. Openings: Form all openings, chases, recesses, etc. shown on the drawings.

D. Cleaning and Oiling: Sweep, clean and oil coat forms before reinforcing is placed.

E. Re-use: Before form material is re-used, all surfaces that are in contact with the concrete shall be thoroughly cleaned, all damaged places repaired, and all projecting nails withdrawn. Re-use of form material shall be subject to specific approval of the Architect and Supervising Engineer.

F. Joints: Provide expansion and contraction joints where shown on the drawings. Provide construction joints as detailed and where required. Construct joints in accordance with ACI 301-72.

G. Wetting Forms: In hot weather, wet down forms with hose immediately before placing concrete.

H. Built-in Items: Cooperate with all trades for the installation of reinforcement, inserts, anchors, sleeves, and other built-in items.

I. Edge Forms and Screeds: Set edge forms and screeds accurately to produce the designed elevations, slopes in the finished surfaces. Provide required slope to drains.

3.2 REMOVAL OF FORMS

A. Forms shall be removed in accordance with requirements of the ACI Building Code Requirements for Reinforced Concrete, No. 318-71, Chapter 6, and the ACI publication "Recommended Practice for Concrete Formwork," No. 347-68, except as modified below, without damage to concrete and in a manner to insure complete safety of the structure. Leave shoring in place until concrete member will safely support its own weight plus any live loads that may be placed upon it.

B. All shores under slabs having 16'-0" or less clear span shall remain for a minimum of 7 days providing the 7 day test cylinder shows at least 3/4 of the 28

day compressive strength requirement. Add ½ day shoring time per foot for each foot over 16'-0" span to maximum of 14 days.

C. In all weather, all concrete slabs having 16'-0" or less clear span shall have had 3 days of 70°F and 4 days of 50°F before shore removal. Spans over 16'-0" shall have had 3 days of 70°F and 50°F for the remaining days providing that the 7 day test cylinder shows at least 3/4 of the 28 day compressive strength requirement. In cold weather (below 40°F) an extra 7 day test cylinder shall be job cured under the same conditions as the concrete.

D. Shoring under beams shall remain a minimum of 28 days and the concrete must have achieved full 28 day strength prior to stripping. Forms shall be built so that column forms can be removed first, then the sides of beams where they occur, than the slab forms. Shoring for beams must be placed on the column center lines and the beam bottoms and their shoring shall be so constructed that they can be left in place after the rest of the forms have been removed.

E. Removal of Shores and Reshoring: After form removal at slabs, "back-post" within four hours after original shores are removed. Backposting shall remain in place a minimum of 28 days and longer when required to carry added loads on the slab from forms supporting newly cast concrete and other loads from the construction of floor or floors above.

F. Upon removal of forms, the Architect shall be notified by the Contractor in order that an inspection of the newly stripped surfaces may be made prior to patching.

G. Freshly stripped surfaces shall not be pointed up or touched in any manner before having been inspected by the Owner and Architect.

### 3.3 INSPECTIONS OF CONCRETE SURFACES

A. The Owner and Architect will inspect the completed concrete work after the forms have been removed. Work that does not conform to the shapes, lines and dimensions shown on the drawings, within the tolerances specified under Article 3.1.A.9 as determined by the Owner and Architect, shall be repaired and/or removed and replaced by the Contractor at his own expense.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes furnishing and installing all reinforcement for cast-in-place concrete including all accessories required. Welded wire fabric reinforcement in slabs and wrappings for concrete encased steel beams, girders and columns are included under this section.

C. Related work specified elsewhere:

1. Concrete Formwork: Section 03100.
2. Cast-in-Place Concrete: Section 03300.
3. Masonry Reinforcement: Section 04200.

D. Furnished and installed under other sections:

1. Reinforcing for concrete filled lintels and bond beams: Section 04200.

1.2 REFERENCE STANDARDS

A. The following specifications and standards are incorporated by reference:

1. American Concrete Institute, Manual of Standard Practice for Detailing Reinforced Concrete, ACI 315-65.

2. American Concrete Institute, Building Code Requirements for Reinforced Concrete, ACI 318-71.

3. American Concrete Institute, Specifications for Structural Concrete for Buildings, ACI 301-72.

4. Concrete Reinforcing Steel Institute, Placing Reinforcing Bars, 2d Edition, 1975.

5. Concrete Reinforcing Steel Institute, Manual of Standard Practice, 1973.

1.3 SUBMITTALS

A. Shop Drawings: Submit fabrication and placing drawings in accordance with Section 01300.

PART 2: PRODUCTS

2.1 MATERIALS

- A. Welded wire fabric: ASTM A185.
- B. All reinforcing bars: ASTM A615, Grade 60.
- C. Supports and Accessories: Conform to ACI 315-65. Where concrete surface is exposed to view or weather, use plastic supports, include all spacers, chairs ties, slab bolsters, clips, chair bars and other devices for properly assembling, placing, spacing, supporting and fastening the reinforcement. Metal supports shall be of such a type as not to penetrate the surface of the formwork and show through the surface of the concrete. Individual and continuous slab bolsters and chairs shall be of a type to complement the various conditions encountered and must be capable of supporting a 300-pound load without crushing.

2.2 DETAILING

- A. Detail concrete reinforcement in accordance with ACI 315-65 and ACI 318-71.

2.3 FABRICATION

- A. Shop fabricate to size, dimension and shape shown on approved shop drawings and within tolerances specified in ACI 301-66. After fabrication, sort, bundle, and metal tag reinforcement before delivery to the job site.
- B. Concrete slabs on grade shall be reinforced as follows, unless noted or detailed otherwise on the drawings:  
  
    Slabs 4" or less in thickness - - - - - 6 x 6 - 10/10 welded wire fabric.  
    Slabs 5" thick - - - - - 6 x 6 - 8/8 welded wire fabric.  
    Slabs 6" thick - - - - - 6 x 6 - 6/6 welded wire fabric.
- C. Cast-in-place concrete walls shall be reinforced in accordance with Chapter 14 of the American Concrete Institute Building Code (ACI 318-71), unless noted or detailed otherwise on the drawings.

PART 3: EXECUTION

3.1 PLACEMENT

- A. Place concrete reinforcement in accordance with the approved placing drawings, CRSI recommendations and CRSI Manual of Standard Practice and in accordance with tolerances specified in ACI 301-72.
- B. Place only reinforcement that is free of mill scale, excessive rust, or other coating that would prohibit proper bond with the concrete.
- C. Support reinforcement and guard against displacement during concreting.

3.2 FIELD QUALITY CONTROL

- A. Notify the University when all reinforcement is in place for each pour at

least 24 hours in advance of placing concrete. Allow no placing of concrete until the Owner has inspected concrete reinforcement in place in forms.

B. Corrections shall be made by the Contractor at his expense.

C. Exposed reinforcing steel in finished work, indicating the bars are not properly located, will be sufficient cause for the rejection, removal and replacement of the concrete section.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all cast-in-place concrete work.

C. Related work specified elsewhere:

1. Concrete Formwork: Section 03100.
2. Concrete Reinforcement: Section 03200.
3. Structural Steel: Section 05120.
4. Metal Fabrications: Section 05500.

D. Furnished by Owner:

1. Retain and pay for testing agency for field quality control only, (Contractor shall retain and pay for testing agency for materials testing and mix design.)

E. Furnished and installed under other sections:

1. Concrete bond beam and lintel fill: Section 04200.

F. Installed but not furnished under this Section:

1. Certain imbedded items: See other sections.

1.2 REFERENCE STANDARDS

A. The following specifications and codes are incorporated by reference:

1. American Concrete Institute Publications:
  - a. ACI 301-72, "Specifications for Structural Concrete for Buildings".
  - b. ACI 318-71, "Building Code Requirements for Reinforced Concrete".
  - c. ACI SP-15, Field Reference Manual.
  - d. ACI 613, "Recommended Practice for Selecting Proportions for Concrete".
2. National Ready Mixed Concrete Association Publications: "Concrete Plant Standards and Truck Mixer and Agitator Standards".
3. Portland Cement Association Publications:
  - a. "Design and Control of Concrete Mixtures", 11th edition
  - b. "Construction Joints" (AC 19.3)
  - c. "Curing Concrete" (ST 95)

d. "Specification for Vibrating Concrete" (ST 26)

B. The Contractor shall at all times keep available on the site for reference the above codes and standards.

1.3 QUALIFICATIONS

A. Mix design: Mix designs and aggregates testing shall be performed by an independent testing agency approved by the Owner and paid by the Contractor.

B. Testing Agency: Testing agency for field quality control will be selected and paid by the Owner.

1.4 SUBMITTALS

A. Mix Design: Submit reports in triplicate of all concrete mix designs and aggregate reports to the Architect for approval at least 14 days prior to pouring concrete.

PART 2: PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement:

1. Portland Cement shall be an approved brand conforming to ASTM C150 - Type 1; Penn-Dixie, Universal Atlas Cement, Northwestern or Lehigh.

B. Aggregates:

1. Fine Aggregate: Washed inert, natural sand conforming to the requirements of ASTM C33.

2. Coarse Aggregate: Well graded crushed stone or washed gravel conforming to the requirements of ASTM C33 as follows:

a.	<u>Location</u>	<u>Maximum Size</u>
	Footings . . . . .	1½"
	All other concrete . . . . .	3/4"

C. Water: Clean, free of deleterious amounts of acids, alkalies or organic materials.

D. Admixtures:

1. Water Reducing Agent: ASTM C494, W.R. Grace WRDA, Master Builders Pozzoloth 100N, or approved equal.

2. Admixtures (e.g., calcium chloride) causing accelerated setting of cement in concrete shall not be used without written approval of the Architect.

3. Admixtures shall be premixed in solution form and dispensed as recommended by the manufacturer. The water in the solution shall be included in

the computation of water-cement ratio.

E. Grout: Pre-mixed, nonshrinking grout, Master Builders Embeco Grout, U.S. Grout Company Five Star Grout, Sonneborn Ferrolith G "D.S", or approved equal.

F. Surface Treatments:

1. Curing Compounds and Floor Sealer: Brock-White Crete-Seal, A.C. Horn Clear Seal 150, Sonneborn Kure-N-Seal, Master Builders Company's Masterseal or Protex Triple Seal.

2. Bonding agent: W.R. Grace Hornbond, Uniweld, Sonneborn Sonobond, or approved equal.

3. Non-slip Aggregate: Sonneborn Frictex NS, Grace Durafax, Norton Alundum or approved equal, graded to pass a 1/8" mesh and be retained on a 1/32" mesh.

## 2.2 CONCRETE RELATED MATERIALS

A. Vapor barrier: 6 mil polyethylene, clear, vapor permanence rating not exceeding 0.5 perm as determined by ASTM E96, Procedure E, fungi resistant.

B. Polyethylene tape: Brock-White 3322, Seamless Rubber Company 670, or Dow Polyethylene Tape, clear.

C. Expansion joint fillers: Preformed, non-extruding type.

1. Non-bituminous type, ASTM D1752 where used with a sealant.

D. Dovetail Slots: 22 gauge G.I. Dovetail Anchor Slots equivalent to Gateway Beehive Slot.

## 2.3 CONCRETE MIXING

A. Mix Design: Employ and pay for the services of an independent testing laboratory, acceptable to Owner, to test the proposed aggregate and design mixes for each type of concrete required. Design mixes shall be proven by preliminary tests prior to concreting in accordance with ASTM C192. Such tests shall show 28 day average strengths at least 25% greater than strength specified.

1. The Contractor shall make available to the Testing Agency all materials and mixtures for the concrete mix designs as well as sufficient samples of fine and coarse aggregates for qualitative acceptance tests. All samples shall be available at least five (5) weeks before the Contractor proposes to use them in the work. Duplicate small samples shall be plainly and neatly labeled with the source, where proposed to be used, date and name of the collector, and presented to the Architect for permanent reference. The materials acceptance tests, trial mix data, and recommended job mixtures shall be presented to the Architect for approval as soon as possible and at least five (5) working days prior to the proposed beginning of concreting. Materials shall not be delivered to the site or used until the samples shall have been approved, and as used they shall in

all respects be equal to the approved samples.

2. Sample and test each type of aggregate in accordance with applicable ASTM procedures.

3. Design concrete mixes in accordance with ACI 301, except as modified herein.

B. Types, Strengths and Locations.

1. All concrete used for this construction shall be regular weight concrete.

2. All concrete used for this construction shall have a minimum compressive strength of 4000 pounds per square inch at 28 days of age.

C. Minimum Cement Content:

1. The laboratory designed concrete mixes shall have minimum cement contents for each type of concrete as follows:

4,000 lbs. per sq. inch (regular weight) - without water reducing admixture  
6.25 sacks per cubic yard for the 3/4" maximum size aggregate.  
6.00 sacks per cubic yard for the 1 1/2" maximum size aggregate.

4,000 lbs. per sq. inch (regular weight) - with water reducing admixture  
5.75 sacks per cubic yard for the 3/4" maximum size aggregate.  
5.50 sacks per cubic yard for the 1 1/2" maximum size aggregate.

D. Slump and Workability:

1. Slump:

a. The slump shall be not less than 1" nor more than 4".

b. The amount of slump shall be determined by the standard test method ASTM C143.

2. Workability.

a. Workability shall be such that when adequately vibrated with high cycle internal vibrators the concrete will consolidate completely without segregation.

E. Mixing and Delivery of Concrete:

1. All concrete shall be ready mixed concrete provided by a central mixing plant. All concrete shall be completely plant mixed in a stationary mixer and the mixed concrete shall be transported to the job in agitating type trucks in accordance with ASTM Specification C94.

2. Deliveries shall be timed to insure that all concrete can be placed within one (1) hour after initial mixing water is added.

3. Batching, mixing and delivery equipment, operation and procedures shall conform to the recommendations of the National Ready Mixed Concrete Association.

4. Partially hardened concrete shall not be retempered or used.

5. Concrete placed in air temperatures below 40°F shall have a temperature of 60°F. Temperature of individual materials, including mixing water, shall not exceed 140°F.

6. Adding water to mix: No water shall be added after the initial introduction of the mixing water for the batch, except under special conditions. When on arrival at the jobsite it is found that the slump of the concrete is less than specified under such conditions, additional water to bring the slump within limits may be added only with the approval of the University's representative. It shall be injected into the mixer under such pressure and direction of flow that the requirements for mix uniformity are met. The drum or blades shall be turned an additional 30 revolutions or more if necessary, at mixing speed, until uniformity of the concrete is within these limits. When water is added to the batch upon arrival at the jobsite, it must be noted on the delivery ticket and signed by the University's representative. Water shall not be added to the batch at any later time.

F. Changes in materials:

1. If, during the progress of the work, the Contractor desires to use materials other than those approved (originally) or if the materials from the source originally approved change in characteristics, additional tests shall be made with new materials which will produce concrete meeting with the stated requirements and not cause objectionable change in the color or appearance of the structure. These additional tests shall be made by the Testing Agency, at the expense of the Contractor. No concrete made from such different materials shall be used in the work until the Architect has given his approval.

2. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished by the Vendor, the Architect may order such changes in the proportions or materials, or both, as may be necessary to secure the desired properties, subject to the stated requirements. Any changes so ordered shall be made at the Contractor's expense, and no extra compensation will be allowed by reason of such changes.

PART 3: EXECUTION

3.1 CONCRETE PLACEMENT

A. Inspection of Forms and Reinforcing: At least 24 hours prior to placing of concrete notify the University's representative so that he may inspect forms and reinforcing in place.

B. Placing: Prepare, convey and deposit concrete in accordance with ACI 301, except as modified herein.



1. Remove water and foreign matter from forms and excavations and, except in freezing weather or as otherwise directed, sprinkle porous subgrade and wood forms just prior to placing concrete to eliminate suction. Place no concrete on frozen soil and provide protection against frost action.

2. Deposit concrete continuously and in layers or sections of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section.

3. All concrete shall be thoroughly compacted and consolidated following procedures recommended by ACI 609, "Consolidation of Concrete".

4. Contractor shall provide sufficient labor and equipment to thoroughly compact all freshly placed concrete by internal mechanical vibration. Before each concrete placing operation is started, the Contractor shall have on hand at the project two complete high cycle vibrator outfits in good operating condition of each size and type of vibrator needed to adequately consolidate the concrete scheduled to be placed. All concrete shall be compacted with the aid of high cycle internal electrical mechanical vibrators for a sufficient duration and intensity to fill all voids, thoroughly consolidate and compact the concrete in place, to produce a dense mass of smooth surface concrete without honeycomb and a minimum of bug holes.

5. Deposit concrete so as to maintain, until the completion of the unit, a plastic surface approximately horizontal. In thin sections (such as walls and columns) of considerable height, concrete shall be placed in such a manner as will prevent segregation, rehandling or flowing and accumulations or hardened concrete on the forms or reinforcement above the mass of concrete being placed. To achieve this end, suitable hoppers, spouts with restricted outlets, tremies, etc., shall be used as required. Openings in the side of the walls will not be permitted. Vertical free drops shall not exceed four feet. Place concrete in layers not exceeding 12" in depth, each layer compacted by mechanical vibrating equipment.

C. Grouting structural steel: Install a full bed of non-shrinking mortar grout under all steel base plates and bearing plates bearing on concrete. Proportion, mix and place in accordance with the manufacturer's instructions.

### 3.2 EMBEDDED ITEMS AND FASTENING DEVICES FOR OTHER WORK

A. Provide for installation of inserts, hangers, metal ties, anchors, bolts, and other fastening devices required for attachment of other work. Properly locate in cooperation with other trades and secure in position before concrete is poured.

B. Where concrete surfaces are veneered with masonry, install 22-gauge galvanized iron dovetail anchor slots in concrete set vertically 2'-0" on centers.

C. Embed no pipes other than galvanized electrical conduit in concrete. Embed conduit only under the following conditions:

1. Do not cut or displace reinforcement.
2. In slabs restrict conduit diameter to 1/3 of slab thickness and locate within middle half of slab.
3. Run conduit larger than 1/6 of slab thickness approximately parallel or at right angles to reinforcing, not diagonally.
4. Place parallel conduits apart at least six times conduit diameter.

### 3.3 MISCELLANEOUS CONCRETE ITEMS

A. Construct miscellaneous concrete items noted and shown on the drawings as detailed. Provide and install anchors and bolts in concrete where directed and required.

### 3.4 COORDINATION WITH OTHER TRADES

A. Include installation of anchors, sleeves, ties, angles, etc., furnished by trades responsible for the facilities to be attached to these devices. Such trades shall be notified by the Contractor and their work done before concreting. Leave openings in walls, for pipes, ducts, etc., required for the ventilation, heating, electrical and plumbing work. Notify all trades concerned with sleeves, inserts, etc., to check their work before concrete is cast.

### 3.5 CONSTRUCTION JOINTS

- A. Vertical construction joints in walls shall be located where noted on the drawings and constructed as detailed.
- B. Vertical construction joints in slabs supported on steel framing shall be located over the structural steel supports.
- C. Construction joints in concrete slabs-on-grade shall be constructed as detailed.
- D. Unless detailed otherwise, all reinforcing steel and welded wire fabric shall be continued across joints.
- E. Keys and dowels at construction joints shall be provided as detailed or directed by the Architect.
- F. Provide preformed expansion joint filler at all intersections of slabs on grade (including interior) with vertical surfaces.

## 3.6 CONCRETE FINISHING

### A. General:

1. The intent of this Specification is to secure for the job materials and workmanship of such quality that only nominal finishing will be required to produce concrete surfaces equal to the best obtainable with the concrete and forming materials specified. Surfaces which reveal, upon removal of forms, imperfections of such magnitude as to seriously impair the appearance of the structure, in the opinion of the Architect, shall be deemed cause for rejection, and concrete members containing such imperfections shall be entirely removed and replaced without damage to adjacent material or extra expense to the Owner. Lesser imperfections of concrete surfaces shall be patched and finished in accordance with the procedures hereinafter specified.

2. Finish only properly set concrete. Under adverse weather conditions, finish only under proper protection.

3. The Contractor, at his own expense, shall do all leveling and grinding of depressed and high spots in concrete surfaces in excess of the tolerances specified herein. In areas where leveling materials are required to provide the proper surface, such materials shall be of a type approved by the Architect.

4. Protect all concrete work against injury from heat, cold and defacement of any nature during construction operations.

### B. Repairing and finishing of formed surfaces:

1. It is the intent of this Specification to require forms, mixtures of concrete and workmanship so that concrete surfaces, when exposed, will require no patching except for plugging of tie holes. Repairable defective areas, as determined by the Architect, and all tie holes shall be repaired in accordance with the procedure outlined in the ACI 301, Chapter 9, except as modified herein.

2. As soon as the forms have been stripped, fins and projections shall be removed and the areas smoothed out with wet carborundum stones or power grinders to the extent directed, in areas where the concrete surfaces will be exposed.

3. Efflorescence, stains, oil, grease, or any unsightly accumulation of foreign materials visible on the exposed surface of finished concrete will require remedial action to remove these blemishes.

4. Finishing of concealed concrete surfaces: At surfaces to receive waterproofing membranes or dampproofing coatings, chip off fins and other projections and trowel patch all voids, honeycombs and air pockets exceeding  $\frac{1}{2}$ " in any dimension. Patch voids formed by tie-rod cones flush with adjacent surfaces. At other concealed surfaces, patching, if any, shall be as directed and shall, in general, be only such as is required to assure or protect the structural integrity of concrete or reinforcing.

### C. Flatwork and flatwork finishes:

1. Flatwork placing and finishing shall comply with the procedures and requirements of ACI 301, Chapter 11, except as modified herein.

2. No dry cement or mixture of sand and cement shall be applied to surfaces of any concrete slab to absorb moisture.
3. Protect floors from damage until completion of job.
4. Provide a troweled finish on all concrete floors.
5. Provide a floated finish on the concrete roof slabs to receive roof insulation and roofing.
6. Provide a non-slip finish on interior stairs and ramps.

a. Procedure: Allow the concrete surface to harden until it bears the weight of workmen standing on boards. At this time, the specified non-slip aggregate, previously soaked in clean water for not less than 10 minutes, but free of excessive moisture, shall be broadcast and imbedded and the slabs trowel finished in accordance with ACI 301. Sand blast non-slip finished surfaces lightly. Apply non-slip aggregate at the rate of 20 pounds per 100 square feet of area.

### 3.7 CURING AND PROTECTION

A. Curing and protection shall be performed in accordance with ACI 301, Chapter 12 and the following additions:

1. Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.

2. Immediately after placing or finishing, all concrete surfaces not covered by forms shall be protected from loss of moisture by the use of one of the following materials or methods:

a. Covering with waterproof paper or polyethylene film conforming to ASTM C171.

b. Applying specified curing compound conforming to ASTM C309.

3. Sheets of waterproof paper or polyethylene film shall be lapped a minimum of six (6) inches at edges and ends and maintained in place by sealing laps with pressure-sensitive tape and weighting down as necessary.

4. Curing compounds shall be applied within two hours after the concrete has been finished.

5. Curing compounds shall be applied in accordance with the manufacturer's recommendations and shall not be used on any surface against which additional concrete or other cementitious materials are to be bonded.

6. If forms are to be removed during the curing period, one of the curing materials or methods specified for concrete surfaces not covered by forms shall be employed immediately and continued for the remainder of the curing period.

7. The curing period shall continue until the accumulative number of days, not necessarily consecutive, during which the temperature of the air in contact with the concrete is above 50°F has totaled seven days.

8. Rapid drying at the end of the curing period shall be prevented.

B. Cold weather protection:

1. Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during freezing weather and near freezing weather. Concrete materials and reinforcements, fillers, forms and ground with which the fresh concrete is to come in contact shall be free from frost.

2. Arrangements for heating, covering, and insulation shall be made in advance of pouring concrete and shall be adequate to maintain the required temperature and moisture conditions without injury to the concrete due to concentration of heat or carbon dioxide flue gases. In general, except as herein specified, follow the recommendations of ACI 306 "Recommended Practice for Cold Weather Concreting".

3. When the temperature of the surrounding air is below 40°F fresh concrete, when placed, shall have a minimum temperature of 60°F and a maximum temperature of 80°F depending on the existing conditions.

4. Special precautions must be taken to protect concrete slabs and steps scheduled to receive a troweled finish, from cooling too rapidly or from surface freezing during the finishing operations. Slabs to be troweled shall not be cast during cold windy weather unless an enclosed heated shelter is provided above the area to be cast and finished.

5. Curing temperature for structural concrete shall be maintained as follows:

a. Regular concrete made with Type 1 regular Portland Cement shall be maintained at not less than 70°F for the first 72 hours and 50°F for the next 3 days.

b. High early strength concrete made with regular Portland Cement may be obtained by the addition of 25% more cement to the mix or by adding 1% calcium chloride in standard solution dissolved in a part of the mixing water, according to directions of the Calcium Chloride Institute. Sikacrete may be used as recommended by the manufacturer. Accelerators are not to be considered as a substitute for any type of protection from freezing. Calcium chloride shall not be used in concrete placed over metal decking, permanent metal forms or concrete that will be permanently exposed to the weather.

c. High early strength concrete made by adding 25% more cement as an accelerator shall be maintained at 70°F for the first 24 hours and 50°F for the next three days.

6. At the end of any curing period, the concrete shall be allowed to cool gradually (approximately 1°F per hour) by leaving the covering protection in

place and intact for a minimum of 24 hours. In no case shall structural concrete be exposed to freezing for a full 6 days after it has been cast and has developed strength required to support itself and any superimposed loads that may be placed on the concrete.

7. High early strength concrete shall not be used for casting thick sections of concrete. Specific approval must be obtained from the Architect and the University before using any high early strength concrete.

8. During freezing weather the Contractor shall take the temperature of the concrete at regular intervals during the curing period and maintain temperature records of the various concrete sections at locations as directed by the University to insure proper curing temperatures are being maintained.

#### C. Hot Weather Concreting:

1. Care shall be exercised during hot weather to keep concrete temperatures and mixing and placing time to a minimum.

2. Transport trucks shall be dispatched to avoid delays and the work shall be organized to use the concrete promptly to prevent unnecessary additional mixing at the jobsite.

3. When necessary, arrangements for installation of windbreaks, shading, spraying, sprinkling or wet covering of a light color shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.

4. Production, delivery, placement and protection shall comply with the American Concrete Institute Standard entitled "Recommended Practice for Hot Weather Concreting" (ACI 605), except that concrete shall be placed within one hour after the initial mixing water is added.

D. Wet Weather: Unless adequate protection is provided do not place concrete in rain, sleet, or snow.

### 3.8 FLOOR SEALING

A. All new interior concrete floors and ramps shall be treated with specified sealer as follows, which shall be in addition to any curing compound coating previously used:

1. Clean slabs and apply first coat sealer as soon as possible after curing period is complete, but not less than 28 days after concrete is finished.

2. Clean floors thoroughly and apply two additional coats of sealer immediately before final inspection.

### 3.9 FIELD QUALITY CONTROL (TESTING)

A. Slump Tests: Make slump tests whenever concrete is being poured at the direction of the Owner in accordance with ASTM C143.

## B. Compression Tests:

1. The casting of concrete test cylinders shall be performed by the Contractor at the times selected by the University and under his direct supervision. The Contractor shall arrange and pay for all transportation of concrete test cylinders to the testing laboratory at the proper time as specified.

2. The University will select the testing laboratory for delivery and compression testing of concrete cylinders and will pay for these tests.

3. Prepare standard test cylinders during the placing of concrete in accordance with ASTM 31 and ASTM 172 in sets of two. One set (two cylinders) is required for each day's pour. If the day's pour exceeds 25 cubic yards, prepare in additional set of cylinders for each additional 50 cubic yards or fraction thereof.

4. The test cylinders shall be laboratory tested and shall be stored at the site in 60-80°F temperature range, and so no injury to cylinders will occur, for 24 to 48 hours. After this time the Contractor shall deliver the cylinders to the testing laboratory, taking care not to freeze, crack or damage the specimens. These cylinders shall be laboratory cured and tested at 7 and 28 days of age with tests indicating concrete strengths for compliance with the specifications.

5. During freezing, or near freezing weather (or for special conditions where early removal of forms is requested by the Contractor, and approved by the Owner) concrete test cylinders shall be taken in sets of three. One of the three cylinders shall be a "field condition" cylinder to be placed as near as possible to the final location of the concrete from which the sample was taken and shall receive the same curing and protection as adjacent concrete. The Contractor shall deliver this "field condition" cylinder to the laboratory 28 days after casting or at an earlier age when an earlier field strength data is desired. The other two cylinders shall be stored at the site and delivered to the laboratory for curing and testing as outlined in paragraph 4.

6. Each cylinder shall be marked by the Contractor with the job name, location of pour, date of pour, slump, mix number and strength of concrete specified.

## C. Evaluation of Test Results and Failure to Meet Strength Requirements:

1. Test results shall be evaluated according to the "Recommended Practice for Evaluation of Compression Test Results of Field Concrete," ACI214.

2. Evaluations shall be valid only if the samples have been taken and tests have been conducted in accordance with ACI and ASTM specifications and methods as applicable.

3. If strength tests performed on concrete cylinders, cast at the time the concrete is placed, fail to meet the specified 28 day value, or if the samples have not been taken and tests conducted as specified, the concrete represented by such tests shall be considered questionable and shall be subject to further testing at the expense of the Contractor.

4. These additional tests of questionable concrete shall be performed by an independent testing laboratory, approved by the Architect, and shall be conducted in accordance with ACI 301, Chapter 17 when concrete cores may be obtained in the field or by load tests conducted and results evaluated in accordance with ACI 318, Chapter 20.

5. If the additional tests fail to demonstrate strengths adequate for the intended purpose of the member, or members, in question, as determined by the University and the Architect, all the questionable concrete shall be removed and replaced with concrete meeting the specifications at the expense of the Contractor.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements of pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes mortar for all unit masonry and stone work.

C. Related work specified elsewhere:

1. Concrete for bond beams and/or lintels: Section 04200.
2. Unit masonry: Section 04200.
3. Cut Stone: Section 04400.

D. Furnished but not installed under this section:

1. Mortar is installed under Sections 04200 and 04400.

1.2 SUBMITTALS

A. Test Reports: Submit information copies of all test reports in duplicate to the Architect.

1.3 PRODUCT HANDLING

A. Handle, transport and store mortar materials in a manner that will prevent damage or deterioration from the elements.

## PART 2: PRODUCTS

2.1 MATERIALS

A. Conform to ASTM standard specifications as follows:

1. Portland Cement: ASTM C150, Type I.
2. Quick Lime: ASTM C5.
3. Hydrated Lime: ASTM C207, Type S.
4. Aggregates: ASTM C144.
5. Water: Clean and free of deleterious amounts of acids, alkalies or organic materials.

6. Latex additive: Brock-White 9875 Latex Liquid. Use in lieu of water for setting mortar for stone.

B. Use of masonry cement is prohibited.

## 2.2 MEASURING AND MIXING

A. Measure and mix in accordance with ASTM C270 and the following:

1. Shovel measurement is prohibited.

2. Mix mortar as required for immediate use only and discard any mixed for a period exceeding 2½ hours.

3. MORTAR Parts by Volume Type	PROPORTIONS Parts by Volume of Portland Cement	BY Aggregate of Hydrated Lime or Lime Putty	VOLUME measured in a damp, loose condition	Mortar
M	1	¼	Not less than 2¼ times and not more than 3 times the sum of the volumes of the cement and lime used.	
S	1	over ¼ to ½		

4. Lime Putty: A stiff mixture of lime and water. Keep moist until used. Putty made from quick lime shall be slaked and allowed to soak at least 72 hours before using. Putty made from 92% hydrated lime may be used after mixing.

5. Plain grout: Type M mortar to which water is added to produce consistency for pouring without segregation of the constituents of the mortar. After adding water, stir and work all grout at frequent intervals.

6. Control and accurately maintain the specified proportions of mortar materials during the entire progress of the work.

7. Thoroughly mix cementitious materials and aggregates with the amount of water to produce workability. Machine mix all mortar.

8. Use latex liquid in lieu of water for mortar for stone.

## 2.3 MORTAR PROPERTIES

A. Conform to the property specifications of ASTM 270 and the following:

1. Compressive Strength: The average compressive strength of three 2" cubes of mortar shall not be less than the strength given in the following table for the mortar type specified:

Mortar Type

Average Compressive Strength  
at 28 days-psi

M  
S

2500  
1800

PART 3: EXECUTION

3.1 TYPE OF MORTAR REQUIRED

A. Type: Use Type M for masonry in contact with earth and in exterior walls and Type M or S for all other masonry.

B. Tempering: Adjust the consistency of the mortar to the satisfaction of the mason by adding only as much water as is necessary to obtain workability.

C. Use mortar within two and one half (2½) hours after mixing. Mortar that has stiffened within this time may be retempered with the minimum amount of water necessary to obtain desired workability.

3.2 TESTING MORTAR

A. Owner will select an independent testing laboratory to perform testing as follows:

B. Determine the water retentivity and compressive strength of mortar in accordance with the Test Procedures described in ASTM C91 with the exceptions noted in ASTM C270. Contractor shall pay for these tests.

C. Before starting masonry work make tests on trial mortar mix. Mix mortar for testing in the laboratory from representative samples of mortar materials and proportions to be used in the construction. Contractor shall pay for these tests.

D. Make compressive strength tests on one set of samples from first mortar batch and as the work progresses for each lot of 1,000 concrete block masonry units of each type of mortar or 5,000 brick masonry units or as directed by the University. Owner will pay for these tests.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes furnishing and installing all unit masonry shown on the drawings and specified herein.

C. Related work specified elsewhere:

1. Mortar: Section 04100.
2. Insulation: Sections 07210.
3. Sealants, Gaskets, etc: Section 07900.

D. Installed but not furnished under this section:

1. Bearing plates, anchors, etc. for work of other trades: Applicable Sections.
2. Shelf angles for support of masonry: Section 0550.

1.2 SUBMITTALS

A. Test Reports: Submit test reports in duplicate indicating compliance with applicable specifications for compressive strength, absorption, weight, moisture content and dimensions for each type of masonry unit. Reports on manufacturer's normal quality control will be acceptable for all units for initial acceptance.

1.3 PRODUCT HANDLING

A. Handle, transport and store at the job site in a manner that will avoid damage.

B. Protect masonry units from wetting prior to use. Cube units on pallets at the time of manufacture and deliver to the job with waterproof coverings. Make sure that units remain covered on the job.

1.4 ENVIRONMENTAL CONDITIONS

A. In freezing weather, lay no masonry when the temperature of the outside air is below 40°F, or is anticipated to fall below 40°F, unless suitable means are provided to heat the masonry materials and protect the completed work from freezing.

B. Heat the masonry materials to at least 40°F and maintain an air temperature above 40°F on both sides of masonry for at least 48 hours if Type M mortar is used, and 72 hours if Type S mortar is used.

C. In order to avoid "thermal shock" in concrete block walls, turn heat (either temporary or permanent) on or off at a rate not to exceed 2°F per hour or approximately 50°F per 24 hours.

## PART 2: PRODUCTS

### 2.1 CONCRETE MASONRY UNITS

A. Concrete masonry units shall be of modular dimensions and shall be high pressure steam cured in an Autoclave at a temperature of 350°F to 365°F and a pressure of 120 to 150 PSI and shall conform to the ASTM Specifications and the modifying and additional requirements as indicated below:

1. Hollow load-bearing units: ASTM C90, grade U-1. Use for all concrete masonry units unless otherwise indicated or specified.

2. Solid load-bearing units: ASTM C145, grade U-1. Use only where solid block is indicated or specified.

3. Concrete building brick: ASTM C55, grade U-1.

4. Lightweight units shall be made of expanded clay or shale or other lightweight aggregates conforming to ASTM C331 and shall have an oven-dry weight of less than 105 lb. per cu. foot. Use wherever concrete block is indicated.

5. Face shell and web thicknesses shall conform to Table IV of ASTM C90 except that twelve (12) inch wide units shall have a face shell thickness of not less than one and one-half (1½) inches.

6. The lineal shrinkage tested by the modified British Method (ASTM C426) shall not exceed the following:

Lightweight units	0.030%
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7. The moisture content of the units at the time of delivery shall not exceed 30% of the total absorption.

8. Fire-resistance rated units shall meet requirements of the Underwriters Laboratories, Inc. as to minimum face shell and web thickness to produce fire ratings as indicated on the drawings.

9. Provide special shapes of ordinarily available types such as bullnose units, header units, jamb units, cap blocks, etc.

10. General Appearance Requirements: Exposed units shall be light in color, with uniform fine texture, free of face smears. Broken units shall not be used, and chipped or other defective units will not be acceptable or used where exposed. Not over 5% of units will be permitted to have chips and chips

shall not exceed 3/8" in any dimension. Exposed concrete unit walls to have units uniform in size, texture and color, including all shapes. Architect reserves right to reject a unit masonry manufacturer, if in Architect's opinion, unit quality, color or texture is unacceptable with design intent. Appearance requirements may be waived by University (at its option) for concealed units.

11. Tentative Acceptance: For tentative acceptance of blocks (or brick), provide tests and reports on minimum of five units, from current stock, to provide proof of ability to conform to ASTM Standards. Texture, dimension, tolerance, appearance and test reports will be basis for tentative acceptance of supplier of blocks. Provide samples to Architect for appearance approval.

## 2.2 CLAY MASONRY MATERIALS

A. Facing brick for patching existing brick walls or noted to match clay brick ASTM C216, Grade SW; color, size and texture shall match brick in wall being patched, as approved by the University. Salvaged face brick from the demolition requirements of existing building, may be reused for patching existing brick walls in that building. Brick to be reused must be sound and clean, free of all existing mortar.

B. Selected facing brick shall be ASTM C216, Grade SW and shall be Harvard Modular 87650 Blend as manufactured by Ochs Brick and Tile Co. Confirm with Architect before ordering.

C. Common Brick: Hardburned clay brick, ASTM C62, Grade MW, modular size. Use for concealed wall fillers.

## 2.3 ANCHORS, TIES, ACCESSORIES

A. Zinc coating of anchors and ties: ASTM A153, Class B-2.

B. Zinc coating of wires: ASTM A116, Class 3.

C. Metal ties: 22-gauge galvanized sheet steel, 7/8" wide, not less than 6" in length.

D. Concrete block wall reinforcing: galvanized, butt welded truss design, formed from #9 gauge wire with deformed side rods. Provide in widths of manufactured standards for each wall thickness. Dur-O-Wal or AA Wire Products.

E. Anchors in Concrete: Furnish galvanized dovetail anchors, bolt anchor fixtures, power driven fasteners, etc., as required for anchoring to concrete (slots are furnished under 03300).

F. Wall anchorage: Brock-White #4211 Ankortite, or approved equal.

G. Adjustable wall ties: AA, Dur-O-Wal, Lox-all, or approved equal, rectangular type, galvanized.

H. Control joint gaskets: Williams Weatherite R, AA Titewall, Dur-O-Wal Rapid Control Regular, Sonneborn-Contech, or approved equal.

I. Preformed fillers: W.R. Grace semi-rigid Rodofam, or approved equal.

#### 2.4 CONCRETE FILL

A. Concrete fill for bond beam lintels and/or piers shall be 4,000 psi concrete conforming to Section 03300.

#### 2.5 CONCRETE REINFORCEMENT

A. Concrete reinforcement for bond beams, lintels, and/or piers shall conform to Section 03200.

### PART 3: EXECUTION

#### 3.1 PROTECTION OF EXTERIOR WORK

A. Protect all facing material, sills, ledges, etc., against staining and keep top of walls covered with non-staining waterproof coverings when work is not in progress.

B. During erection keep walls dry by covering at the end of each day or shut-down period. Protect partially completed walls not being worked on similarly at all times. Overhang coverings at least 2 feet down each side of wall, and securely anchor.

C. When work is resumed, clean off all loose mortar from top surface.

#### 3.2 MORTAR

A. Mortar proportioning and mixing is specified in Section 04100.

B. Tempering: The consistency of mortar may be adjusted to the satisfaction of the mason, but only as much water shall be added as is necessary to obtain desired workability.

C. Mortar shall be used within two and one-half (2½) hours after mixing. Mortar that has stiffened within this time may be retempered with the minimum amount of water necessary to obtain desired workability.

D. Type: All masonry shall be laid in mortar of the type specified in the table below:

#### TYPE OF MORTAR REQUIRED

<u>Kind of Masonry</u>	<u>Mortar Type</u>
Masonry in contact with the ground and in exterior walls	M
Masonry above grade, interior	M or S

### 3.3 LAYING CONCRETE BLOCK

A. Lay concrete block in straight, uniform courses, plumb and true to line and plane in running bond pattern unless otherwise indicated on the drawing.

B. Use face shell bedding with full coverage of face shells for hollow units, full bed for solid units.

C. Cut flush all joints in block for tooling as specified in paragraph 3.9.

D. Cut flush all joints in concealed spaces. Fill solid with concrete, two courses under bearing plates, top course of all bearing walls and under beam and lintel bearings. Provide control joints as shown on the drawings.

E. Hollow masonry units shall be filled solid with mortar or concrete at following locations:

1. The first two cells of units abutting door frames (mortar).

2. All cells of units of course immediately above head of door frames (mortar).

3. All cells of units where called for on Drawings (concrete or mortar as indicated).

4. Where necessary for embedment of anchors, bolts, bearing of steel members, and where shown (concrete or mortar as indicated).

5. Bond beams, lintels and/or piers (concrete).

F. Wherever metal items, anchors, bolts, etc., are embedded in mortar or concrete within the concrete unit masonry, provide screen wire stops of galvanized steel insect screening to prevent mortar, or concrete from dropping through the voids below.

G. Reinforce all concrete block masonry work with wall reinforcing starting at second course and at every second course thereafter. Bond facing units to backing with tab tie reinforcing and metal ties. Wall reinforcing splices shall have 6" laps. Corners shall be formed by cutting and bending to fit or by use of prefabricated corner units. Place reinforcing in the first and second bed joint above and below openings or recesses where possible. Terminate reinforcing on each side of control joints.

H. Unless otherwise shown bond each course at corners and intersections, and break vertical joints at least 4". Fill in with concrete brick where units cannot be used. Provide recesses for built-in items.

I. Horizontal Control Joints: All full height non-loadbearing walls and partitions shall be finished 3/8" below concrete slab above for filler and caulking under Section 07900.

J. Vertical Control Joints: Construct as detailed.



K. Partitions that abut exterior walls and columns shall be bonded thereto at least once every two feet in height. Use rigid steel anchors where bonding is not possible.

L. Provide reinforced concrete block lintels over all square head openings unless otherwise noted on the drawings and as detailed. Use bond beam (8" high only) units to construct lintels at exposed locations. Fill lintels solid with 4,000 psi concrete conforming to Section 03300 and reinforce with steel rods as shown on the drawings conforming to Section 03200. Provide a minimum of 8" bearing at ends. Providing shoring for at least 7 days after setting, or precast at least 7 days before setting.

M. Construct bond beams as detailed. Concrete fill is furnished under Section 03300, installed under this section.

N. When flashing is to be laid on or against masonry, the surface of the masonry shall be smooth and free from projections which might puncture the flashing material. Weep holes spaced not more than 24" on center shall be provided in the bed joints under the first course immediately above all flashings.

O. Build in properly all anchors, ties, plates, joists, beams, lintels, flashings, inserts, etc., which come in contact with masonry work. Consult other trades in advance and make provisions for installation of their work in order to avoid cutting and patching. Build in work specified under other sections of these specifications as the work progresses. Grout hollow metal frames full of mortar.

P. Set steel lintels in full beds of mortar. Fill solid with mortar around jams and heads of metal door bucks and frames as walls are laid.

Q. Provide all necessary openings and chases in walls or partitions to take the work of other trades and build in all sleeves, hangers, supports or forms furnished by and placed by them providing such openings are located and such necessary items are furnished and placed by the other subcontractors in advance of construction. No cutting or drilling shall be done without the permission and instruction of the General Contractor and the University.

R. Where new brickwork is laid in existing brick walls it shall be properly bonded or tied with metal ties and shall be toothed in as required to provide a plane surface. Bond, joint and pattern shall match existing.

S. Fill all vertical, longitudinal joints, with mortar by back parging the facing or by pouring full with grout.

T. Use solid units or fill hollow units with mortar or concrete wherever flashing reglets in new masonry are indicated.

### 3.4 LAYING BRICK

A. Wetting Brick:

1. All brick having absorption rates (determined in accordance with ASTM Specifications C67) in excess of 0.025 oz. per sq. in. per min. shall be wetted sufficiently so that the rate of absorption when laid does not exceed this amount.

2. The method of wetting shall be such as to insure that each unit is nearly saturated, surface dry when laid. During freezing weather, units that require wetting shall be sprinkled with warm water just before laying.

B. Pattern Bond: Exposed masonry shall be laid in center bond or to match existing bond pattern. In unexposed masonry, all vertical joints shall be bonded by at least 2".

C. Joining of Work: Where fresh masonry joins masonry that is partially set or totally set, the exposed surface of the set masonry shall be cleaned and lightly wetted so as to obtain the best possible bond with the new work. All loose brick and mortar shall be removed.

D. Workmanship:

1. All masonry shall be laid plumb and true to lines. Brick shall be laid with completely filled mortar joints. The ends of brick shall be buttered with sufficient mortar to fill the end joints. The vertical, longitudinal joints in all except cavity walls shall be completely filled by parging the back of the facing or by pouring the vertical joint full of grout. Closures shall be rocked into place with the head joints thrown against the two adjacent bricks in place.

2. In laying brick the mason shall avoid over-plumbing and pounding of the corners and jambs to fit stretcher units after they are set in position. Where an adjustment must be made after the mortar has started to harden, the mortar shall be removed and replaced with fresh mortar.

E. Anchoring:

1. Exterior brick walls facing against or abutting concrete members shall be anchored to the concrete by the use of dovetailed flat-bar or wire anchors inserted in slots built into the concrete. Anchors shall be spaced not more than 18" vertically and 24" horizontally.

2. A space not less than  $\frac{1}{2}$ " width shall be maintained between masonry wall and concrete members. This space shall be kept free of mortar or other rigid material so as to permit differential movement between concrete and masonry.

### 3.5 MASONRY REINFORCING

A. Wall Installations: Provide reinforcing in every concrete block wythe including 4" walls, if any.

B. General Requirements: Provide proper width for all thickness to insure

complete imbedment of side rods or tab ties in full mortar bed. Carry continuously along walls, lapping ends 6" minimum, except do not carry through control and expansion joints. As a minimum, all reinforcing as specified herein.

C. Types: Provide truss design for all types. Provide types as follows:

1. At concrete block walls and partitions, provide normal truss type with diagonal cross rods welded to side rods.

2. At brick adjacent to block where cavity does not occur, provide extended type reinforcing; full width (less 1" each side) of block and brick wythes.

D. Corners: At all corners and wall intersections, except intersections intending to act as control joint, provide prefabricated corner and intersection units.

E. Location and Spacing: Unless otherwise indicated, provide reinforcing as follows:

1. 16" o.c. vertical dimension, continuous full length of wall.

2. At bed joint at top course of wall or partition, continuous full length of wall.

3. In first and second courses below and above each wall opening, extending at least three feet beyond opening jamb, in addition to continuous reinforcing noted under "1" above.

4. Do not carry through control joints.

### 3.6 JOINTS

A. Where fresh masonry joins masonry that is partially set or totally set, the exposed surface of the set masonry shall be cleaned so as to obtain the best possible bond with the new work.

B. If it becomes necessary to "stop off" a horizontal run of masonry, this shall be done only by racking back one half unit length in each course and, if grout is used, stopping grout 4" back of the rack. Tothing will not be permitted, except upon written approval of the University.

C. Where cutting of exposed units is necessary, the cuts shall be made with a motor-driven masonry saw.

D. Exposed mortar head and bed joints in block walls shall have a thickness equal to the difference between the actual dimension and the nominal dimension of the unit either in height or in length, but in no case less than  $\frac{1}{4}$ " nor more than  $\frac{1}{2}$ ". Joints shall be as uniform as possible.

E. Where flashing reglets are indicated in new or existing masonry, cut such reglets using a motor driven masonry saw.

### 3.7 POINTING, TOOLING, CLEANING

A. Exposed joints in walls of concrete masonry units shall be, unless otherwise noted, tooled with a round or other approved jointer when thumb-print hard. The jointer shall be slightly larger than the width of the mortar joints so that complete contact is made along the edges of the units, compressing and sealing the surface at the joint. Wipe joint, if necessary, to remove all excess mortar, so no rough edges remain.

B. Joints in new brickwork in existing walls shall be tooled to match existing joints.

#### C. Cleaning:

1. Upon completion, cut out defective mortar joints, cut out cracked, broken, chipped or badly scratched brick or block and replace with matching units. Point up all exposed masonry.

2. Clean test panels to test cleaning method before actual cleaning is begun. Test or protect all surrounding non-masonry surfaces from cleaning materials or fumes.

3. Remove all excess mortar spots, drips and smears from face brick, and exposed concrete block.

4. A minimum curing and drying period of twenty eight (28) days shall elapse between topping out of a masonry wall section and the start of the cleaning operation.

5. Following the curing period, all face brick, exterior and interior shall be cleaned with specified cleaning solution. Clean, potable water shall be readily available for cleaning operations.

6. Pre-soak prior to cleaning operations.

7. Saturate masonry with clean water and flush off loose mortar and dirt. Scrub down walls with a solution of  $\frac{1}{2}$  cup trisodium phosphate (Calgon) plus  $\frac{1}{2}$  cup household detergent dissolved in one gallon of clean water. Scrub with a stiff fiber brush only. Thoroughly wash off all cleaning solution, dirt and mortar crumbs using clean pressurized water. Sonneborn-Contech and Sure-Klean masonry cleaners will be acceptable.

8. Do not use muriatic acid or proprietary cleaning compounds without the prior written approval of the Architect. Do not use metal cleaning tools and brushes or abrasive powders.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes removal and resetting of existing cut stone at exterior interface with new construction, removal and disposal of existing cut stone at interior of new construction, and providing and installing new cut stone as shown on drawings.

C. Related work specified elsewhere:

1. Mortar: Section 04100.
2. Unit Masonry: Section 04200.

1.2 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01300. Drawings shall show in detail the sizes, sections and dimensions of stone, the arrangements of joints and bonding, anchoring and other necessary details. Show joint construction, including dowel anchorage.

B. Samples: Provide one (1) sample, 12" x 12" x 1", for approval by the Architect. Samples shall be typical of the color, texture and finish, and shall match existing limestone in vicinity of new work.

1.3 PRODUCT HANDLING

A. Stone shall be removed and handled or received and unloaded at the site with necessary care in handling to avoid damaging and soiling.

B. Stone shall be stored clear of the ground on non-staining skids and adequately protected by covering with non-staining waterproof paper or minimum 8 mil polyethylene film.

## PART 2: PRODUCTS

2.1 CUT STONE

A. Cut Stone: Indiana buff limestone matching color, texture and finish of adjacent limestone. New stone is required if existing cannot be salvaged for resetting as well as where indicated on drawings.

B. Cutting: Accurately cut to shape and dimensions as detailed to approved jointing layout. Provide all exposed faces true, without wind. Beds and joints shall be at right angles to the face; unless otherwise shown. Joints, unless otherwise shown or indicated on drawings, shall have a uniform thickness of  $\frac{1}{4}$ ".

Comply with the fabrication tolerances of the Indiana Limestone Institute.

C. Defects: No patching or hiding of defects will be allowed. No drilled holes on exposed face. No cracked, broken or chipped stone may be set or reset.

D. It is intended that existing stone shown cut back to brick face (inside new construction) may be drilled and sheared in lieu of sawcut; the remaining surface shall have a generally flat surface plus or minus  $\frac{1}{2}$ " from brick face.

## 2.2 ACCESSORIES

A. Anchors, dowels, cramps and fastening: Furnish and set all anchors, cramps, and dowels and fasteners, shown or required to fasten and anchor the stone properly in place. All anchorage shall be stainless steel (Type 18-8, 302 or 317).

B. Weep Holes: Ropes of glass fiber or  $\frac{1}{4}$ " clear plastic tubing.

## 2.3 MORTAR

A. Mortar: Provide mortar type M conforming to Section 04100.

## PART 3: EXECUTION

### 3.1 GENERAL

A. Do not use stone units with chips, cracks, voids, stains or other defects which might be visible in the finished work. All stone units that cannot be handled manually or set with a clamp, shall be provided with proper lewis holes. Lifting of stone with lewis pins shall be in the same plane that holes are drilled.

B. Provide expansion joints where shown or required. Do not fill with mortar. Install continuous strips of preformed joint and sealant conforming to Section 0790.

C. Set stone accurately, true to levels, lines and shop drawings. Set plumb, level, square with uniform joints, with full mortar bed and joints, strike joints slightly concave and tool to a dense hard surface. Use lead shims where required. Fill all sinkage, anchor and dowel holes solid with mortar.

D. Cut ropes or tubes at face of mortar or sealant.

### 3.2 PROTECTION AND CLEANING

A. Protect work from rain, mortar stains and soil. Where materials may be passed over stone, protect stone with non-staining covering to eliminate damage from construction.

B. Near end of work, clean stone, using only clean water, fiber brushes and mild soap powder. Rinse thoroughly.

C. Replace damaged, soiled or otherwise defective stone work.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnishing and erection of all structural steel and related items.

1. Structural steel and related items includes the shapes, end connections, base plates, cap plates, anchor bolts, connection bolts, expansion bolts and other structural steel items shown on the structural drawings.

C. Related work specified elsewhere:

1. Masonry: Sections 04100, 04200.
2. Miscellaneous Metals: Section 05500.

D. Furnished by Owner:

1. Retaining and paying for Testing agency.

1.2 REFERENCE STANDARDS

A. The following specifications and standards are incorporated by reference:

1. American Institute of Steel Construction (AISC), Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, February 12, 1969 and Supplements 1 through 3.

2. AISC, Code of Standard Practice for Steel Buildings and Bridges, adopted effective July 1, 1970.

3. American Welding Society, Code for Welding in Building Construction D1.1-72.

4. American Institute of Steel Construction (AISC) Specification for Structural Joints using ASTM A325 or A490 Bolts.

5. Steel Structures Painting Council Manual, Volume 2, Systems and Specifications, Second edition, 1969.

B. Where ASTM standards or specifications or other recognized trade or industry standards or specifications are referenced in this specification, such standards or specifications shall be the latest editions effective at the time of bidding.

### 1.3 SUBMITTALS

A. Shop Drawings: Submit fabrication and erection drawings in accordance with Section 01300, Submittals.

### 1.4 QUALIFICATIONS

A. Welding procedures, welders, welding operations and tackers shall be qualified in accordance with AWS Building Code. Inspection of such qualifications shall be in accordance with Article 604 of AWS Code.

### 1.5 PRODUCT HANDLING

A. Handle, store and erect structural steel and related items in a manner that will avoid damage or deformation.

B. Storage of Materials:

1. Structural steel members which are stored at the project site shall be above ground on platforms, skids or other supports.

2. Other materials shall be stored in a weathertight and dry place, until ready for use in the work.

3. Packaged materials shall be stored in their original unbroken package or container.

## PART 2: PRODUCTS

### 2.1 MATERIALS

A. Structural steel shapes and plates: ASTM A36.

B. Unfinished Bolts: ASTM A307, Grade A. (Use for anchor bolts, hoist beam hanger bolts and other connections where noted on details.)

C. High-Strength Threaded Fasteners: ASTM A490.

D. Welding Electrodes: E70XX.

E. Expansion Bolts: McCulloch Industries "Kwik-Bolts", Wej-it Expansion Products, Inc. "Wej-it Bolts", or approved equal.

F. Shop Paint Primer: Hentzen Chemical Coatings, Inc., #4080 Red Oxide Zinc Chromate Primer, or the equivalent products of Tremec Company, SCM Glidden, Pratt & Lambert or Sherwin Williams.

G. Grout: Grout is included under Section 03300, Article 2.1E.

### 2.2 DETAILING

A. Prepare detailed fabrication and erection drawings in accordance with the AISC Code of Standard Practice for Steel Buildings and Bridges and the AISC Specification for the Design, Fabrication and Erection of Structural Steel for



Buildings.

B. Mark all items of structural steel showing sizes, lengths, locations, details, ASTM designations and painting where noted or specified.

### 2.3 FABRICATION

A. Fabricate structural steel in accordance with the Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings and the Code of Standard Practice for Steel Buildings and Bridges of the American Institute of Steel Construction.

B. Provide punching, drilling, clips, connections, etc. as indicated on the structural drawings or specified herein.

C. Shop connections shall be welded in accordance with the American Welding Society Code for Welding in Building Construction unless otherwise shown or noted.

D. Provide loose angles for miscellaneous supports for concrete slabs as noted and detailed on the drawings.

E. Painting:

1. The two hoist beams shall be shop painted. Other items of structural steel shall not be painted.

2. Hoist beams to be shop painted shall be thoroughly cleaned of all mill scale, loose rust, dirt, grease and other foreign matter in accordance with Steel Structures Painting Council SSPC-SP 1-63 and SP 2-63 and apply one coat of specified primer in accordance with the applicable SSPC specifications.

### 2.4 FABRICATION TOLERANCES

A. Structural steel shall be fabricated so that straightness and length are in accordance with the tolerances specified in Article 1.23.8 of the AISC Specification.

## PART 3: EXECUTION

### 3.1 ERECTION

A. Erect structural steel as shown on approved erection drawings and in accordance with the AISC Specification and AISC Code of Standard Practice.

B. Storage on-site for structural is extremely limited. Erection shall be accomplished directly from the trucks unless permission for the use of specific areas for on-site storage is obtained from the Owner.

C. Bolted connections: Use ASTM A490 bolts at all steel to steel connections unless specifically noted otherwise on details.

D. Welded connections: Make welded connections as shown on the structural drawings and in accordance with AWS Code for Welding in Building Construction.

E. Bracing: Provide temporary bracing and connections in accordance with Article 1.25 of the AISC Specification.

F. Erection Tolerances: The structural steel framing shall be erected to be within the tolerances specified in Article 7(h) of the AISC Code of Standard Practice for Steel Buildings and Bridges.

G. Field Assembly:

1. Structural steel frames shall be accurately assembled to the lines and elevations indicated, within the specified erection tolerances.

2. The various members forming part of a complete frame or structure after being assembled shall be aligned and adjusted accurately before being fastened.

3. Fastening of splices of compression members shall be done after the abutting surfaces have been brought completely into contact.

4. Bearing surfaces and surfaces which will be in permanent contact shall be cleaned before the members are assembled.

5. Field connections shall be as specified on the drawings.

6. Report to the Architect any construction deviation that prevents the proper assembling, fitting or connecting of structural steel and obtain his approval of all reaming, chipping, cutting, welding, shimming or any other method of correction to be used.

7. Do not cut openings in the field through structural steel members for the passage of conduit, pipes, ducts, etc., without obtaining prior approval of the Architect. Whenever approval to cut openings in the field is obtained, provide openings and additionally reinforce the member as directed by and under the supervision of the Architect.

H. Grouting: See Section 03300, Article 3.1.C.

### 3.2 FIELD QUALITY CONTROL

A. Testing Agency retained and paid by Owner will perform the following:

1. Inspection of erected structural steel work for conformance with the requirements specified.

2. Inspection of Field Assembled High Strength Bolted Connections shall be in accordance with Section 6, AISC Specifications for Structural Joints.

3. Inspection of Field Welds shall be in accordance with Section 6 of AWS Code and as follows:

a. Ultrasonic inspection of the field welds indicated in accordance with Appendix C of AWS Code.

B. Work that is not approved shall be corrected by the Contractor at no additional cost to the Owner.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this Section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing and installing all utilitarian miscellaneous metal and ornamental metal items manufactured, fabricated or otherwise specially modified to meet requirements of this Project and not specified under other sections of this specification or provided under other contracts. In general, this includes field applied (welded, embedded, bolted, anchored, etc.) metal items adjacent to other materials. "Field-weld" is the key term used to identify miscellaneous metal items in relation to main structural steel members indicated on architectural drawings. Use the following listing only as general guide to clarify the intent of work provided under this Section as to general type. Do not construe as listing or describing all required items. Exposed parts of all items indicated this (\*) in all spaces (except tunnels, shafts, mechanical rooms) will be considered work where appearance is a prime consideration for acceptance. Miscellaneous and ornamental metal work of this Section includes, but is not necessarily limited to, the following:

\*1. Stairs and ladders: All steel ships ladders throughout. Include complete framing, landings, checkered plate treads, metal supports, anchors and all other work to secure to structure and complete.

\*2. Railings and rail brackets.

\*3. Steel door jambs (except hollow metal).

4. Steel Lintel Plates.

5. Slab channel inserts: Unistrut P3300 Series Continuous Insert Channels of lengths and locations shown on drawings. The equivalent of Globe-strut with maximum 7/8" depth is acceptable.

6. Miscellaneous Steel Items:  
- tube column door frame supports.  
- shelf angles  
- Angle door sill

7. Channel and Nelson studs shown at detail 11/S2 (at floor access doors).

8. Steel Access doors.

C. Related work specified elsewhere:

1. Structural metal: Sections 05120.
2. Preformed metal siding: Section 07411.
3. Caulking and Sealants: Section 07900.
4. Hollow metal doors and frames: Section 08110.
5. Louvers: Section 10200.
6. Floor Access Doors: Section 08301.

## 1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings of all items furnished under this Section in accordance with Section 01300. Show all gauges and weights of metals, type of metal, finish, fastening, welds, joinings, reinforcements, supports, anchors, relation to adjacent materials, accessories and other pertinent data.

## 1.3 PRODUCT HANDLING

A. Protect, handle, deliver and store in a manner that will avoid damage or deformation. Store metal off ground and provide covering for metal in storage.

## 1.4 COORDINATION

A. Coordinate work directly with Contractor and other Subcontractors. Provide and obtain necessary dimensions, clearances and similar data for work related to items provided under this Section. Where necessary to insure proper fitting and assembly work, ship fabricated metalwork to other Subcontractors with all shipping charges paid by metal fabrications subcontractor.

## 1.5 FIELD DIMENSIONS

A. Obtain and verify all necessary dimensions in field to accurately fit to conditions as constructed. The nature of the various other materials including concrete and masonry, makes it mandatory to obtain dimensions, elevations, squareness of openings and similar conditions affecting work of this Section. Included are conditions relating to stairs, railings, gratings and frames, opening frames and inserts cast in for threads.

## 1.6 QUALITY OF WORK

A. General: Miscellaneous and ornamental metals have been combined in one metal fabrications section as result of close relationship of various elements and since similar end products would be provided under separate sections. Do not construe the combining of two sections as relieving Contractor of furnishing and installing exposed work, where appearance is a prime consideration, in any other manner than to highest quality of work. Deliver, store and protect such items (where first and highest quality work is required for appearance) and any in unsatisfactory condition will be rejected.

B. Subcontractor: All work shall be fabricated and provided by a fully qualified, experienced firm with a history of providing satisfactory metal work of the types included herein, and which is acceptable to Architect. If necessary to insure meeting of quality requirements, all work of this Section shall be provided by a fabricator specializing in ornamental work.

C. Standards in General: Conform to standards of Architectural Metal Manufacturers Association in absence of project specification or drawing requirement.

D. Exposed Work: Appearance is a prime consideration for items similar to those designated above. For such exposed items, all aluminum shall have fine satin and uniform finish, all stainless steel shall have #4 finish, unless otherwise specified. Steel shall be smooth surfaces, cold formed, cold rolled or drawn steel that is free from blemishes. Where necessary to use structural steel shapes for "finished" items, exposed surfaces shall be finished to provide surfaces similar to cold formed work.

## PART 2: PRODUCTS

### 2.1 MATERIALS

A. General Metals: Metals shall be free from defects impairing strength or durability and be of best commercial quality for use. For exposed work, where appearance is a factor, provide smooth, unblemished metal, free of rust, scale, pitting, mill marks and similar markings.

B. Steel: Hot rolled mild steel 0.15% to 0.25% carbon range. For structural steel, provide ASTM A36-70. Where appearance is of prime consideration, provide cold rolled steel and non-structural shapes of mild steel which has been cleaned or pickled and rolled or drawn through dies producing a material free from scale and accurate to size or gauge, equal to samples in Architect's office. Structural shapes, where appearance is a prime consideration (and shapes noted or specified as cold rolled but not so made) shall be sand blasted as necessary to achieve unblemished smooth surface, essentially equivalent to cold rolled steel. Select steel for exposed work to eliminate dented, bent, crooked, warped or otherwise damaged steel and to provide best possible appearance. Provide full length pieces, no built-up lengths, crops or stubs. Provide tube and pipe steel that is straight, with proper wall thickness, free of dents, warps, twist or similar defects.

C. Tubing: Sizes as indicated, smooth, unpitted surfaces equivalent to cold rolled steel, seamless, straight and true to size.

D. Pipe: Smooth surfaces, unpitted, undamaged.

E. Galvanized Sheet Metal: ASTM 361-71, G-90 coating designation. No damaged or dented metal.

F. Checkered Plate: Inland's "4-way" or similar approved pattern of other manufacturers,  $\frac{1}{4}$ " thick unless noted.

G. Galvanizing:

1. Scope: Provide where noted or specified.

2. Galvanizing: Hot dipped galvanizing in accordance with ASTM A386-65, Class B, 2.0 oz. of pure zinc on thickness  $\frac{3}{16}$ " and over, 1.5 oz. on thickness of metal under  $\frac{3}{16}$ ". (Metal thickness or gauges are before galvanizing.) Clean, degrease and pickle steel prior to galvanizing. Clean, remove drips or

teats on exposed work. Galvanize after fabrication, no cutting or welding after galvanizing. Galvanize to prevent warping, distortion or similar defects and conform to ASTM A-384-59 and A-385-62 as applicable.

H. Paste Solder: Fill exposed non-welded field joints with hard setting paste solder of approved type. Apply smooth, flush, completely filling joint. File when hard to smooth surface free of file marks, flush with adjacent surfaces. Touch up with paint.

I. Fastenings: Best, most appropriate type for connections to be made, of sufficient number and strength for intended use. Provide all fastenings and holes for joining work of this section together and to other building components. Provide stainless steel screws at aluminum work and non-ferrous (not galvanized) screws or bolts at exterior work and at areas where moisture is present.

J. Caulking Tape (by Erector): Provide caulking tape where indicated and/or where steel abuts other materials. Furnish and install extruded ribbons of non-shrinking, non-staining, non-bleeding and paintable tape equal to Tremco's #440. Use proper size to fill and seal joint by compressing tape in joint.

K. Wall access doors: Milcor Style M, or approved equal.

## 2.2 FINISHES

### A. Paint:

1. On ferrous metal: Approved rust inhibitive paint, Rust-Oleum #769 or Pratt and Lambert's Noxide Primer.

2. On galvanized metal: 80% metallic zinc dust primer, Federal Specification TT-P-641B, paint all galvanized work that is exposed unless noted herein.

## PART 3: EXECUTION

### 3.1 FABRICATION IN GENERAL

A. General: Fit and assemble in shop, ready for erection so far as possible. Fabricate and erect square, plumb, level, straight and true. Fit accurately with tight joints and intersections. Make substantial and securely fasten. Meet highest standards of trade.

B. Exposed Work: Give particular attention to work where appearance is a consideration to obtain smooth unblemished surface finish. Grind off all mill marks, burrs and similar rough edges. Fill flush and smooth out all holes, pits, joints and cracks. Grind smooth, flush with adjacent surfaces. At any reworked surfaces, such as welds or removed mill marks, smooth the surface by filing and buffing to provide finish matching remainder of surface, without grind marks, hollows, depressions or other noticeable surface variation.

C. Formed Metal: Bend metal without marking or rupture of metal. Unless otherwise indicated, make bends as sharp as possible.

D. Railing: At tube and pipe railings, provide flush end closure plates at exposed otherwise open ends. Provide accurately set sleeves for close, uniform fit to post, leaving proper amount of space for grout. Grout space solidly full of lead or sulphur.

E. Joints: Provide joints, connections, intersections in best miscellaneous or ornamental practice as appropriate. Provide splined, doweled, shouldered, pinned or similar positive joints as necessary and approved. Where necessary at exterior, provide permanently weathertight joints, connections and intersections exposed to weather. Provide continuous weld (by "skip" welding if necessary) where such weld will best exclude weather. Use paste solder, where required and specifically approved by Architect, to fill field joint cracks.

F. Edges: Ease sharp edges or corners, as approved, that might be source of injury. Ease all sharp edges of handrails.

### 3.2 WELDING

A. General: Conform to American Welding Society's Code for Welding in Building Construction, latest edition as applicable, using skilled welders. For "structural" type welds, use care to provide welds which will develop proper stresses in welds, using licensed welders, inspected by qualified welding inspectors. Conform to other requirements specified elsewhere herein.

B. Exposed Work: Use plug welding including field joints, where required or where plug welds will provide best possible joints. Provide other exposed welding by cutting and grinding a suitable "vee" to receive weld and insure rigid connection flush with original surface. Provide full length welds, generally. Grind and finish as previously specified.

C. Field Welding: Welds made in field subject to same requirements. Field weld where indicated on drawings or as required to provide positive connections, weathertight joints and to provide neat joint connections.

### 3.3 PAINTING

A. General: Apply, in shop, a uniform coat of paint to all ferrous and galvanized surfaces, as well as specified areas of aluminum work. Apply to clean degreased surfaces free of dirt, rust, oil, moisture, other foreign material that will interfere with coating functions. Apply paint carefully, smoothly finish and with full coverage including connections. Allow to fully dry before handling. Provide paint film suitable to protect work during building construction and suitable to receive painter's finish, with no runs on exposed surfaces.

B. Touch-Up: Apply coat of paint at scratched or abraded areas and field weld areas immediately after erection; erected work to show no bare metal or scratched paint.

C. Dissimilar Materials: Apply two coats of paint to aluminum surfaces in contact with masonry, concrete, steel or similar dissimilar materials.

### 3.4 STAIRS AND LADDERS

- A. General: Construct to details indicated and where not otherwise shown, follow standards of Architectural Metals Handbook as approved. Include all stringers, fascia plates, treads, tread and riser pans for concrete finishes, landing beams and framing steel bracket supports, platforms, header channels, platform supports, supports for treads and risers, clips and other devices to secure to structure, temporary and permanent spreaders, cross bracing, channel tread supports, railing anchorage, spacers, and all other work required to complete stairs except for pan fill material.
- B. Shop Assembly: Shop assembly as far as possible. Typically, steel stairs are designed to be shop fabricated and assembled for each run. Completely shop assemble each run, with treads, landings and railings welded to stringers, ready for installation as a "unit". Handle with care to prevent racking, twisting, straining of welds, or other damage.
- C. Steel Plate Treads: Where treads are of exposed steel plate, provide "checkered" plate. Bend treads to form nosing and back lip as indicated. Fit treads and risers neatly and tightly to stringers.
- D. Exposed Work: Metal exposed after stair completion shall be subject to requirements previously specified. Exceptions are: ships ladders, but these shall be made of new, undamaged steel, free from excessive scale pits, dents, cuts or similar defects. Note: Face of stringer next to walls, within 12" of walls, are not considered exposed steel for purposes of quality of work.
- E. Erection: Install to provide substantial, well anchored and rigid stairs, with: straight stringers; vertical rails and facias; level treads; uniform stringer spacing from walls; smooth, undamaged metal; workmanship of highest quality.

### 3.5 RAILINGS, GUARDRAILS, AND WALL BRACKETS FOR RAILS

- A. Scope: All metal railings, handrails, brackets and other necessary and related items at interior and exterior, including stairs, ramps, areaways, and elsewhere indicated or specified. Types as shown, of pipe, solid bars, channels and tubes. Fabricate to details indicated, including anchorage devices and sleeves.
- B. Fabrication: Fabricate to highest quality, with metal free of scale, pits and similar imperfections, to provide smooth surfaces. Submit samples of tube, bar and channel rails for approval, with pickets attached. Where necessary to achieve neatly fabricated work, use plug welding. No paint runs. Sharp edges of handrails and railings shall be lightly eased. Plug welding or welds at "vee" joints shall be used to preserve shape of railing sections. Where pickets are welded to top of plate stringers or facias, level or vee cut pickets each side, for welding, and finish for exposed work and for appearance being a prime consideration.
- C. Sleeves: Provide galvanized sleeves required at all posts set in concrete, galvanized. Anchor to slabs or weld to steel to accurate locations.
- D. Removable Rails: Provide where indicated complete with fittings, necessary bolts, slip-slug sleeves.



E. Pipe Rails: Construct pipe railings and pipe handrails flush with smooth curves, without rupturing or deforming the pipe. Cap all exposed ends, weld and grind flush and smooth. Provide 1½" I.D. pipe unless otherwise noted. Provide approved wall flanges where connecting to walls.

F. Pipe Rail Brackets: Unless otherwise shown, provide Julius Blum and Company, Inc. #378 malleable iron, flat black finish, complete with expansion shields and threaded studs. Equivalent brackets of other manufacturers may be used.

G. Erection: Set to proper height, level where appropriate, straight, true, with pickets perfectly plumb in both directions. Fasten by welding or bolting as indicated, to form rigid and permanently anchored units. Neatly field weld to provide concealed or non-visible welds. Where set into sleeves, sleeves shall form tight fit, be accurately set.

### 3.6 TOUCH-UP

A. Touch up coat of paint at scratched or abraded areas and field weld areas. Clean these areas and touch up immediately upon erection. Finish erected work to show no bare metal or scratched paint.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this Section: The following outline is a general listing of the type and character of work required under this Section. Do not construe as listing all work, materials or areas, nor describing each part of the work.

1. Wood framing, fire blocking, plates, nailers, blocking, bucks, stripping, furring, backing, grounds, including: nailers, blocking, cant strips and at roof; roof curbs; control joints, nailers and blocking for casework wood grounds (permanent and temporary) and similar wood and carpentry items.

2. Miscellaneous thermal insulation (batt and blanket).

3. All other wood items shown or required and not provided under other sections.

4. Install hollow metal doors furnished ready-to-hang, under Section 08110.

5. Preservative treatment of wood as specified herein.

6. Furnish and install rough hardware, including framing anchors, nails, spikes, bolts, carriage bolts, nuts, washers, screws, toggle bolts, recessed grommets, etc., as required for work of this section. Bolts, nuts, washers for connecting wood framing to steel and concrete. Anchors for securing wood to masonry, steel or concrete.

7. Temporary enclosures required to protect work and public, temporary wood self-closing doors opening into heated spaces.

8. All other carpentry and miscellaneous work required.

C. Related work specified elsewhere:

1. Concrete Formwork: Section 03100.
2. Hollow Metal: Section 08110.

1.2 PRODUCT HANDLING

A. Protect all lumber at job site from exposure to moisture and weather.

## PART 2: MATERIALS

### 2.1 GENERAL LUMBER

- A. Dimension and Framing Lumber: Douglas Fir, "Construction" and "Select Structural" as applicable.
- B. Other Non-Finish and Non-Framing Board Lumber: Douglas Fir, "Construction". Equivalent grades of Ponderosa Pine, Sitka Spruce or White Pine acceptable.
- C. Grading: All lumber graded according to WCLIB Standard 16, "Dry".
- D. General: All lumber shall be dry material, surfaced 4 sides (unless otherwise indicated), each piece grade marked (except boards). Provide new wood for all lumber used at permanent part of the work (unused during construction).

### 2.2 MISCELLANEOUS INSULATION

- A. Batt or blanket glass fiber insulation full thickness for void; Owens-Corning, Carney, W.R. Grace, or approved equal.

### 2.3 EXPANSION MATERIALS

- A. Expansion Materials: "Ethafoam", or approved equal. Use where expansion joint material is noted and not installed under other sections.

### 2.4 TAPES, SEALANT, ADHESIVES AND MISCELLANEOUS

- A. General Adhesive: All as recommended by manufacturer of the product to be applied for the surface material to which it is applied, guaranteed to give permanent adhesion, with material remaining flat to back surface.
- B. Insulation Adhesive: Dow's insulation Mastic #7 or other adhesive recommended by insulation manufacturer. Adhesive shall dry (or set) rapidly and not attack or soften the insulation.
- C. Sealant: As specified under Section 07900, for application.
- D. Sealing Tape: Tremco's tape 440, or approved equal polyisobutylene-butyl, reinforced.
- E. Caulking Compound: Tremco's Synthetic Resin Sealant, or approved equal.

### 2.5 PRESERVATIVE TREATMENT OF WOOD

- A. General: Treat by vacuum or pressure method, using approved preservative that will not stain or bleed, is paintable and will not cause softening or deterioration of roofing where wood member is built into roof. Subcontractor performing treatment shall: Review all conditions; confirm applicability of treatment and advise Architect if change in treatment is recommended; submit a proposed list of treatments for approval; dry thoroughly before installation; treat after cutting to shape, ends of preservative treated wood that are job cut

shall be given two swab coats of Penta-WR.

B. Preservative Treatment, Exposed Wood: "Penta-WR" water repellent preservative meeting Federal Specification TT-W-572, accomplished by vacuum process, treated to refusal (approximately 2 lbs of solvent per cubic foot).

C. Preservative Treatment Concealed Wood: For wood at roof, exterior and interior concealed wood, treat by pressure process using Wolman Salts, dried after treatment, retention about 3.5 lbs. dry chemical per cubic foot. Retention as recommended by manufacturer and treating plant for condition.

D. Extent of Preservative Treating: Treat all wood at (1) cant strips, nailers, curbs, blocking and other wood a permanent part of structure at roof (2) all permanent wood at exterior of building, (3) other wood subject to damp or humid conditions, (4) all wood in contact with masonry or concrete.

## 2.6 ROUGH HARDWARE, FASTENERS, ANCHORAGE DEVICES AND STEEL STUDS

A. Extent: Provide all rough hardware required, including nails, screws, bolts, lag screws, grommets, cinch anchors, joist hangers, toggle bolts, shot anchors, and similar items.

B. General: Provide proper size and type for use intended and for materials to be fastened. Install adequate hardware to insure substantial and positive anchorage. Use hot dip galvanized nails at exterior work. Anchor wood ground with toggle bolts or similar approved device. Nailing into wood plugs is not acceptable for any work. Where shot anchors are noted or specified or used, use Ramset of type and size recommended by manufacturer for conditions of use.

## PART 3: WORKMANSHIP AND INSTALLATION

### 3.1 FRAMING, NAILERS, BUCKS, CANT STRIPS

A. General: Install plumb, level, true and square to dimensions shown and required. Allow for finishes and proper clearances where necessary. Provide sound bearing, square cuts, full bearing surfaces. Framing to be 16" o.c. unless specifically noted otherwise. Set crown up for horizontal members. Provide double top plates and single bottom plates at stud partitions. Locate studs, horizontal members or backing behind all joists. Provide solid support under end joints. Shim and block where required. Eliminate crooked, twisted, cupped or bowed framing where such defects will interfere with or prevent highest finishing with other materials. Anchor in substantial, accurate manner to hold dimensions required. Shim and block where required. Accurately rip cant strips and other special shapes as shown and required. Provide blocking above ceiling for ceiling mounted items.

B. Anchorage: Adequately anchor, fasten and support all members in best trade practice to form secure, substantial and accurate anchorage and to hold required dimensions and prevent twist. Exercise care at all hangers, and similar work to provide permanent support. Use bolts and screws to eliminate loosening up of joints, sagging or similar movement.

### 3.2 FURRING, STRIPPING, GROUNDS AND BACKING

A. Install plumb, level, true and square. Anchor substantially for permanent installation. Install stripping or furring for paneling 16" o.c. unless otherwise specified. Set and shim to a straight edge so finish wall is true and straight. Provide grounds and backing as shown or required. Verify ground sizes and locations before installation.

### 3.3 INSULATION

A. General: Install all insulation in accordance with manufacturer's recommendations (including adhesives), unless otherwise specified herein, to full thickness throughout spaces to form well insulated spaces. Carefully cut and fit. Install with large headed nails or staples at wood and with mastic and anchors at concrete or masonry to form secure anchorage. Install with tight butt joints. Replace any insulation that has holes, becomes torn or is damaged. Do not use small pieces. Cut neat holes around obstructions.

### 3.4 FINISH HARDWARE

A. General: Refer to Article 1.1.C this section, for information relative to hardware. Carefully install hardware, using skilled finish carpenters. Fit before painter's finish is applied, remove and install after finish is complete. Install hardware so that all operating parts operate smoothly, close tightly and do not rattle. At all screw holes install proper screws, install hardware firmly anchored.

B. Doors: Hang doors so they will stand in any open position. At each door, install bumper, stop or holder. Set door stops so bumpers occur at reinforced areas of doors. Verify condition for stops prior to installation. Where conditions permit, doors shall swing over 90° and install for 180° swing wherever possible. Stops shall be securely anchored to guarantee permanent installation.

C. Closers: Adhere to manufacturer's directions for closers, including location at opening (as well as distance from door edge), closer size, anchorage and other factors affecting proper installation. Verify any questionable installations with hardware supplier prior to installing closers. All closer installations shall be done by thoroughly skilled and trained workmen. One trained workman shall adjust (and re-adjust) all closers after installation.

D. Thresholds: Set metal thresholds in full bed of specified caulking compound, forming tight seal between threshold and surface to which set. Securely, permanently anchor thresholds using countersunk non-ferrous screws to match color of threshold (stainless steel screws at aluminum thresholds).

### 3.5 GENERAL WORKMANSHIP

A. Provide all workmanship to meet highest standards, accomplished by skilled mechanics. For finished millwork use experienced finished carpenters only. All exposed wood shall be free of hammer marks, abrasions, splinters, gouges, etc. Set all nails at exposed wood surfaces.

3.6 WORK OF OTHERS

A. Examine all sections of Specifications and drawings so as to properly anticipate work which must be built into, attached to, butted against, concealed by, etc. work of others and furnish and install such bucks, backing, supports, openings and other items as may be required.

- - -

## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all elastomeric membrane waterproofing.

C. Related work specified elsewhere:

1. Cast-In-Place Concrete: Section 03300.
2. Bituminous Dampproofing: Section 07150.
3. Building Insulation: Section 07210.
4. Built-Up Bituminous Roofing: Section 07510.
5. Flashing and Sheet Metal: Section 07600.
6. Sealants: Section 07900.

1.2 GENERAL INFORMATION

A. General: Following information is intended to complement and clarify the intent of the drawings but do not construe as outlining all required work. Provide all materials and installation to complete the work. Provide all work, flashing and related materials to complete the entire installation and to provide complete water barrier integrity to the building spaces.

B. Elastomeric Waterproof Membrane: Provide membrane at: (1) All exterior slabs, tunnels, and similar locations which have a space below, where the membrane typically is built into construction (not the roof areas where the built-up membrane and gravel is the surface); (2) Other exterior areas where shown on drawings; (3) Vertical surfaces of all foundation walls in contact with earth or backfill, including tunnels, where a space occurs on the interior side of the wall, minimum of 3'-0" above footing and carried a minimum of 1'-0" out onto footing (Note: this foundation wall membrane generally is not indicated on the drawings). Use heavy duty membrane at locations where bituminous paving is laid directly on membrane.

C. Flashing: Provide all flashing and base flashing in conjunction with waterproofing including: up all walls, curbs and similar abutting surfaces, at joints and intersections, and elsewhere required to insure water integrity. Where flashing height requires the flashing to extend above the concrete topping slab or other wearing course, flashing is to be covered with metal counter flashing (with metal under Section 07600) as indicated (details may not fully

indicate metal counter flashing thus, but all locations where flashing becomes exposed to the weather are to be so covered).

D. Compatibility: Where any flashing, membrane or other material, new or existing, (including sealants and gaskets) are to be built into, or be in contact with each other, verify the compatibility of the materials prior to commencing work. Do not use materials that are incompatible, will soften or cause deterioration to plastic or cold applied membranes or other materials. If necessary, provide and use alternate materials as approved, without additional cost.

E. Installation of insulation and other covering materials: Coordinate and schedule all work with insulating subcontractor so that membrane is protected and cover provided without delay.

F. Notice: Give notice to University when materials are delivered to permit examination and testing. Give at least 7 days notice before starting any work to permit inspections to be scheduled.

G. Certificate: Provide manufacturer's certificates, prior to starting work, certifying all materials are in accordance with specified requirements.

H. Instructions: Conform to the material manufacturer's directions, instructions or specifications, unless these project specifications are in excess of (but not in conflict with) the manufacturer's directions, in which case these specifications shall govern.

### 1.3 GUARANTEE AND INSURANCE

A. Guarantee: Provide 5 year written guarantee for work of this Section, in the same form and generally the same conditions (as applicable) specified under Article 1.4 of Section 07510, except: annual inspections shall be limited to examining spaces below membrane work with a representative of the Owner to check for evidence of leaks; and the work to repair any leaks shall include the removal and replacement of the surface (and other) materials above the membrane.

B. Insurance: The manufacturer of the cold applied waterproof membrane materials shall effect, and maintain throughout the life of this guarantee, such product liability insurance to cover bodily injury, cost of repairs and damage to property, under a comprehensive liability policy, with the following minimum amounts:

Bodily Injury, each person	\$ 250,000
Bodily Injury, each occurrence	\$1,000,000
Prop. Damage & Cost of Repairs, each occurrence	\$1,000,000

1. This insurance shall be renewable at Owner's option and cost for additional three-year periods.

### 1.4 SUBMITTALS

A. Guarantee: Submit specified membrane guarantee in duplicate to the Architect.

B. Certificates: Submit certificates specified in 1.2.N, herein, in duplicate



to the Architect. Prior to starting work at the site, submit copies of certificates of insurance for the insurance specified under 1.3.B, above, to the Architect and Owner.

### 1.5 DELIVERY, STORAGE, HANDLING

A. Package, handle, deliver and store all materials at the jobsite in a manner which will avoid damage, contamination or spoilage.

B. Storage: Store all materials off the ground and keep under waterproof covering. Do not allow covering to be torn, displaced or otherwise damaged. Store rolls by stacking on end, with adequate platform and clearance to prevent penetration of moisture from grade. Do not pile materials to such weights as will damage deck or insulation.

## PART 2: PRODUCTS

### 2.1 ACCEPTABLE SYSTEMS

A. The system of W.R. Grace Construction Products Division (Bituthene) is specified to establish standards of quality and performance. Any of the following systems are acceptable subject to approval of deviations in details by the Architect and University:

1. Bituthene by W.R. Grace.
2. HLM 1000/1300 by Sonneborn.
3. Jiffy Seal by Protecto Map.
4. Tremproof 50 by Tremco.

### 2.2 WATERPROOFING MEMBRANE

A. Membrane: Rubberized asphalt, integrally bonded to polyethylene film .064" thickness, W.R. Grace & Co's. Bituthene. Use heavy duty Bituthene where bituminous pavement will be laid directly on membrane.

B. Primer: Bituthene Primer.

C. Mastic: Bituthene Mastic.

## PART 3: EXECUTION

### 3.1 GENERAL WORKMANSHIP REQUIREMENTS

A. Workmanship: Conform to best practice and accomplish by using only skilled mechanics. SPILL NO MEMBRANE MATERIALS ON BUILDING OR OTHER MATERIALS. Spilled materials on exposed surface will result in applicator repairing, resurfacing or replacing the stained work. Requirements for installing membrane applies to similar operations for vapor barrier work. See Section 01010 for conditions for working on and over membranes, and Section 01500 for Temporary Heat requirements.

B. General Responsibility: Perform no work in conflict with, contrary to, or below the standards established by membrane materials manufacturer. After

starting work, applicator is responsible for complete water integrity of the membrane, and for providing properly applied membranes which will insure a satisfactory life of not less than 20 years. Therefore, applicator shall:

1. Not apply membranes or other work under any conditions which are not proper and in best recommended practices, including surfaces or weather.
2. Examine decks and other surfaces with prime contractor for suitability of surfaces and not proceed until corrections have been made where necessary. Start of work means acceptance of the deck and conditions by this Subcontractor.
3. Review all drawing and specification requirements and establish control and test procedures to insure compliance.
4. Exercise care to insure adequate quantities of materials are used.
5. Maintain competent foremen continuously supervising the work, with authority to discard unsuitable materials or remove unsatisfactory workmen.
6. Supervise installation of, and be responsible for seeing that drains, curbs, and other work is properly set and membrane is not damaged, make membrane and flashing repairs as necessary; advise Supervising Engineer and Prime Contractor of any potential leaks due to work of others.
7. Resolve questionable installation work prior to proceeding.
8. Inspect deck with Owner representative prior to starting work.

### 3.2 PREPARATION IN GENERAL

A. Surfaces: Properly prepare all surfaces to provide and insure best installation. Decks and other surfaces must be clean and dry. Sweep and clean areas thoroughly before starting work. Do not start work during threatening weather. Notify General Contractor of any areas unsuitable for applying membrane. Do not proceed over frosty or damp surfaces nor until deck is proper. Remove snow from decks and dry thoroughly before starting.

B. Deck Smoothness: Check deck for smoothness and for suitability to receive vapor barrier and insulation. Refer to Section 03300 for required concrete finish. Install no barrier over deck with ridges and/or depressions that will result in unsatisfactory base for work under this section. Have all corrections made to provide deck that meets project requirements and applicator's approval. Start of work is placed immediately after the insulating fill or insulation and immediately covered with insulating fill or insulation.

### 3.3 INSTALLING WATERPROOFING MEMBRANE

A. General: Install membrane waterproofing and flashing (including base flashing of membrane) in accordance with manufacturer's instructions and requirements of this section. Coordinate all work. Provide extra plies of membrane as called for by the manufacturer or as otherwise indicated in the Contract Documents, whichever is the greater requirements.

## B. Preparation of Substrate:

1. Concrete Finish: Horizontal concrete surfaces will have a troweled finish as a minimum, or as otherwise called for under Section 03300.

2. Wearing surfaces will be regular weight concrete block with joints cut flush.

3. Surface Condition: Concrete and masonry surfaces shall be surface-dry and must be cured for seven days before application of membrane or primer. Surfaces shall be broom-cleaned and free of voids, loose stones and sharp protrusions prior to priming or applying membrane.

4. Priming: Membrane is generally applied directly to concrete or masonry; all surfaces must be primed with specified or approved primer.

Apply by brush, roller or spray at the rate of 200 to 400 square feet per gallon until the surface is black, using more than one pass if necessary. Membrane must be applied only after the primer solvents have flashed off and the primer has become tack-free (at least 60 minutes after priming, but not over 36 hours). After 36 hours, surface must be reprimed. Metal, plastics and other dense surfaces need not be primed, but must be clean, dry and free of grease, oil and dust.

5. Temperature: Ambient surface and materials temperatures shall be over 40°F. and under 100°F. during application of membrane primer and mastic to ensure a good bond. At temperatures below 40°F, special techniques may be used for certain applications on recommendation of membrane manufacturer.

## C. Application:

1. Joints: Lay membrane from the low point to the high point across the fall line so that the laps shed water. Apply membrane in double thickness over control and construction joints. Provide a loop of excess material across joints as shown and as necessary to relieve the strain.

2. Sealing Edges: Membrane shall be finished off by sealing it into a reglet joint, or by drawing the membrane down over the edge of a slab or over the top of a foundation or parapet wall, setting and pressing or rolling it down firmly and completely in two parallel  $\frac{1}{4}$ " beads of mastic, then trowelling a liberal bead over edge of membrane. Where these installations are not possible, the top edge of the membrane on the vertical surface must be set and pressed or rolled down firmly and completely in two parallel  $\frac{1}{4}$ " beads of mastic and finished with a troweled bead of mastic. If nails are used, use large head nails and cover with a 6" strip of membrane. Where the membrane is carried over the edge of the slab, carry down wall face a minimum of 18", but in all cases, cover the joint in concrete between the wall and the slab.

3. Sealing Seams: All seams shall be overlapped at least  $2\frac{1}{2}$ ", and pressed or rolled firmly in place. The succeeding strip shall be laid with a minimum  $2\frac{1}{2}$ " overlapping and rolled down firmly and completely. Misaligned or inadequately lapped seams shall be covered with a minimum 6" wide strip of membrane.

4. Corner Details: All inside and outside corners (vertical or horizontal) including where a cant strip occurs, shall be double-covered with membrane by applying an initial strip of 11" minimum width, centered along the axis of the corner. This strip shall be completely covered by the regular application of membrane. Outside corners shall be rounded and inside corners filled with an inorganic cant strip or mortar fillet prior to application. Seams must be carefully sealed in corners. Where details indicate, the base flashing shall be the additional ply of membrane. Any exposed edge of membrane shall have troweled bead of mastic over these edges.

5. Drains and Protrusions: Areas around drains, posts or other protrusions shall have two plies of membrane, set in full beds of mastic, set in clamping ring and edges and ring covered with trowelled bead of mastic. (Drains, connected to sewer, are provided and set under Division 15, built-in under this section). Build-in drains, plumbing vents and similar items as recommended by manufacturer.

6. Membrane Protection, Vertical Surfaces: Within 5 days, cover the membrane. Temporarily hold in place, if necessary until backfilling or other cover is placed. Shield from sunlight.

7. Membrane Protection, Interior and Exterior Horizontal Areas: Immediately after testing the membrane, it shall be covered and protected. Also cover areas at cant strips of flashing to protect the membrane. Promptly advise other sections so the membrane areas are promptly covered and protected by the final finishes.

#### D. Precautions:

1. Punctures and Tears: Care shall be taken not to puncture or tear the membrane prior to covering it. Topping, backfill, insulation or protection board shall be placed immediately to protect membrane. Careful inspection shall be made prior to covering membrane, and any ruptures shall be patched with membrane and mastic.

2. Exposed Edges: If the work must be left partially complete, the exposed edges of the outside strips shall be set and pressed or rolled down in two parallel  $\frac{1}{4}$ " beads of mastic and the edge sealed with a trowelled bead of mastic.

### 3.4 TESTS

A. Flood Tests: Perform flood tests upon completion of the horizontal membrane areas, prior to placing protection board or any subsequent fill or finishes. Construct watertight dams, using membrane materials, and temporarily close drains. Flood area to depth of 1" minimum, maintaining flooded condition for at least 24 hours. Thoroughly test intersections and flashings by flooding or hose testing. Notify the University in advance of testing and inspect the work with the Owner's representative. Repair any leaks and repeat flood test until there is no evidence of leaks.

### 3.5 FOLLOW-UP INSPECTIONS AND SERVICE

A. Project Completion: Just prior to acceptance of entire Project, or covering

with finish surfaces, membrane applicator shall inspect entire membrane, remove all nails, wire, cut metal and other debris. Remove any drips of bitumen. Any "ridging", blisters and similar defects shall be cut open and repaired.

B. Annual Inspection: Provide the inspection and services for three years, in connection with specified guarantee.

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## Part 1: General

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all dampproofing of exterior foundation walls.

C. Related work specified elsewhere:

1. Earthwork: Section 02200.
2. Membrane Waterproofing: Section 07110.
3. Built-up Bituminous Roofing: Section 07510.
4. Gaskets, caulking and sealant: Section 07900.

1.2 DELIVERY, STORAGE, HANDLING

A. Package, handle, deliver and store at the jobsite in a manner that will avoid damage.

B. Deliver all materials in their original, unopened containers, seals intact.

## PART 2: PRODUCTS

2.1 MATERIALS

A. Mastic Coating: Trowelled on pitch base material. Celotex Pitch Base Plastic Cement or similar product of Koppers, or approved equal.

## PART 3: EXECUTION

3.1 APPLICATION, WALLS

A. Extent: Provide dampproofing on outside (earth side) face of all below-grade building foundation walls from top of waterproof membrane (or top of footing if no membrane) to 6" below finish grade. Dampproofing is not required where membrane waterproofing is indicated.

B. Trowel on as recommended by manufacturer to a coat 1/16" to 1/8" thick.

C. Apply to clean, dry surfaces, free of loose particles, projections and similar defects. Remove all such obstructions before proceeding.

D. Accurately establish finish grade lines, or levels of paving or concrete, prior to coating walls to prevent dampproofing above grade. Where concrete, brick pavers, or bituminous surfacing occurs, carry up to underside of the top paving slab.

E. Carry coatings from 6" below grade to footings and carry 6" out on footings to completely seal wall to footing joints. Accurately establish finish grade lines, or levels of paving or concrete, prior to coating walls, to prevent damp-proofing above grade. At Plaza area, carry up to underside of the top concrete slab. Apply coating prior to installation of foundation wall insulation and coat walls where insulation will also be placed. Where coated walls intersect non-coated walls, run bead in corner and carry coating minimum 3 feet onto non-coated walls or 3 feet onto walls of non-excavated spaces.

F. Provide workmanship in best practice, accomplished by skilled mechanics trained in their trade and in strict accordance with manufacturer's instructions. Provide finished work free of damage, blisters, cracks, open joints, pin holes, skips, holidays, thin spots, etc.

G. Where dampproofing is contiguous with asphaltic waterproofing, provide mask of minimum 6 mil aluminum foil. Cement foil to asphaltic membrane with asphaltic plastic cement for top 6" of aluminum foil then apply pitch-base damp-proofing to entire outside face of foil, then fold foil back (up) on itself to produce pocket to retain pitch base material. If the detail calls for asphaltic material above the dampproofing, reverse this foil procedure, folding foil back over asphaltic material.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all thermal insulation except roof insulation.

C. Related work specified elsewhere:

1. Roof Insulation: Section 07241.

1.2 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver packaged materials in original unopened containers with labels or seals intact.

B. Deliver, store and handle all materials at the jobsite in a manner that will avoid damage. Crushed or broken rigid insulation, shredded batt insulation, or cut or torn vapor barrier membranes shall not be used.

## PART 2: PRODUCTS

2.1 THERMAL INSULATION

A. Insulating Materials:

1. Foam plastic insulations, general: Qualification testing shall be acceptable diversified tests such as, but not limited to, tunnel tests (UBC std. 42-1), full scale corner tests or ignition temperature tests.

- a. Flame spread: Foam plastic materials shall have a fire hazard classification of less than 75 when tested in accordance with UBC Standard No. 42-1 in the way intended for use.

- b. Smoke density: Foam plastic materials shall have a smoke density rating no greater than 450 when tested in accordance with UBC Standard No. 42-1 in the way intended for use; or a smoke density rating no greater than 15 when tested in the thickness intended for use in the chamber method test under UBC Standard No. 52-2.

- c. Toxicity: The products of combustion shall be no more toxic than those of untreated wood when burned under similar conditions.

- d. Any foam plastic insulation exposed to interior, in addition to the above requirements, shall be fully protected by a thermal barrier of  $\frac{1}{2}$  inch



gypsum wallboard, or other approved material having a finish rating of not less than 15 minutes as determined by UBC Standard No. 43-1. Thermal barriers shall be installed in contact with foam plastic insulation and in a manner that will assure they will remain in place for the entire 15 minutes.

2. Polystyrene foam board, extruded: Amspec Inc. Styrofoam, SM, or approved equal. Use where insulation is in contact with ground and in masonry walls.

3. Polystyrene foam board, molded: Snow-Larson, Inc. bd Foam, Holland Plastics, Inc., Thermco White FR, Zonolite Styrene Foam, or approved equal, 1 lb. per cubic foot minimum density. Use for all other rigid insulation applications.

B. Adhesives: Use only adhesives which are recommended by the insulation manufacturer for use with the specific insulation on the specific substrates to insure permanent bond.

## 2.2 BATT INSULATION

A. Owens-Corning, Zonolite, or US Gypsum glass fiber insulation, unfaced batts or blankets, thickness as noted on the drawings.

## 3.1 APPLICATION OF RIGID INSULATIONS

A. On walls or overheads: Apply adhesives to substrate surface in sufficient quantity to secure insulation boards. Ties, anchors, pipes and other items penetrating insulation shall be sealed with additional spot of adhesive. Edges of insulation boards shall be butted tight with no voids.

B. Perimeter and foundation insulation: Secure in place to prevent displacement during backfilling or concreting.

## 3.2 INSTALLING BATT INSULATION

A. Install with tight joints, compressing batts slightly.

B. Use batt insulation wherever low density insulation is indicated.

C. Use tape, adhesive or staples to hold batts in place except where they are required to be removable.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all roof insulation. On roofs, the Contractor, at his own option, may substitute rigid insulation tapered, for the gradient fill; see Articles 2.5 and 3.4 herein.

C. Related work specified elsewhere:

1. Cast-in-Place Concrete: Section 03100, 03200, 03300.
2. Miscellaneous Metal: Section 05500.
3. Carpentry: Section 06100.
4. Membrane Waterproofing: Section 07110.
5. Building Insulation: Section 07210.
6. Built-up Roofing: Section 07510.
7. Metal Roof Flashing and Trim: Section 07600.

1.2 SUBMITTALS

A. Submit drawing for Architect's review, showing the elevations to which fill will be placed and locations of all related items.

## PART 2: PRODUCTS

2.1 ROOF INSULATION, OPTION A

A. Silbrico All-Weather Crete, or approved equal, meeting the below specifications are acceptable.

B. Insulating gradient fill shall be an asphaltic insulating thermal setting concrete, consisting of lightweight mineral aggregate and filler uniformly mixed with thermal setting binder. The insulation shall be of a type that can readily be mixed, placed and compacted as hereinafter specified and shall be free from any ingredients that will adversely affect adjacent materials.

C. Fill shall meet roofing manufacturer's approval as a base for a 20 year bonded type pitch and gravel membrane specified in Section 07510. Confirm with subcontractor for Section 07510.

2.2 MATERIALS

A. Mineral Aggregate: ASTM C332, Group I, Perlite.

B. Binder: ASTM D312.

C. Mixture: Meet requirements as detailed for insulation in Underwriters' Laboratories Building Materials List Design No. P906 using approximately equal amounts (by weight) of perlite aggregate (UL List Guide No. 360 R13.15) and asphalt meeting ASTM D312, Type III or Type IV, softening point 190°F to 225°F. Adjust mix for insulation over membranes as recommended by the manufacturer.

D. Sealer: All Weather Crete Rainshield A-10 Sealer.

### 2.3 EQUIPMENT AND WORK AREA

A. Equipment used in mixing, placing and compacting the lightweight insulating concrete shall be powered. Equipment shall be of such weight that will not exceed the design loads of the decking, purlins and other supporting construction.

B. Confine materials and mixing operations to work area as approved by the University. Keep area clean and confine dust or aggregate particles to area. If necessary, provide enclosures to prevent nuisance.

### 2.4 PROPORTIONING AND MIXING

A. The asphaltic insulating concrete shall be mixed in strict accordance with the supplier's directions to produce a homogenous material having the following characteristics:

1. Thickness: Insulation thickness shall be as indicated on the drawings. At locations where thickness is feathered to less than recommended by the manufacturer, fill with Portland cement concrete mix, 3000 psi in accordance with Section 03300.

2. For roof areas "K" Factor shall be .40 as tested by the standard ASTM flat plate method at a mean temperature of 75°F.

3. Density shall be not less than 18 nor more than 22 lbs. per cubic foot in a dry air condition for roof areas.

4. Water absorption shall not exceed 4.5% by volume (ASTM C209).

5. Compressive resistance shall be such that 5,000 lbs. per square foot shall not indent over .06" (ASTM C165).

6. Cut test samples as directed by testing agency, retained and paid by Owner.

### 2.5 RIGID ROOF INSULATION, OPTION B

A. At the option of the Contractor, rigid roof insulation, Pittsburgh Corning, Foamglas, Tapered may be substituted for insulation gradient fill on roof areas only.

- B. Thickness and slope of substitute insulation shall be as detailed on the drawings.
- C. If contractor elects the option of rigid insulation, he shall install additional roof drains as shown on drawings.

### PART 3: EXECUTION

#### 3.1 APPLICATOR

- A. The applicator of insulation gradient fill shall be licensed by the manufacturer of the system to apply the system.
- B. Apply insulating gradient fill in strict accord with the recommendations and specifications of the system manufacturer.

#### 3.2 PREPARATION

- A. Examine deck areas for suitability. Remove moisture, frost or snow. Exercise care to prevent vapor barrier damage and repair any damage. Close openings or small holes in deck with an asphalt mastic. Close roof drains temporarily to prevent fill in drains, remove plugs daily. Provide concrete "collar" around roof drains to prevent material from flowing under drain into building. Cover larger openings with sheet metal. Sweep or otherwise clean the decks or vapor barriers. Keep decks dry so material is installed over clean and properly prepared surfaces.
- B. Prime bare decks and protection board, as well as vapor barriers when recommended by manufacturer, to insure tight adhesion of fill. Use asphaltic primer recommended by manufacturer for bare decks and flood coat or mop vapor barriers using 30 lbs. minimum of asphalt per square, ASTM D-312, Type I.
- C. If necessary to install insulating fill over the vapor barrier at metal decks, avoid damaging the vapor barrier; fill flutes in deck level with deck insulation prior to vapor barrier installation.

#### 3.3 PLACING AND COMPACTING INSULATION

- A. The asphaltic insulating gradient fill shall be placed, compacted and sealed by workmen skilled in this type of installation and in accordance with the supplier's specifications to a uniform density throughout; the top surface shall have a relatively smooth finish, ready for the application of the roofing or waterproof membrane construction thereon. Insulating gradient fill at Plaza areas shall be 2" minimum thickness at drains, 1/8" minimum pitch to drain.
- B. All fill at roof is to be placed over vapor barrier of the type specified and provided under Section 07510. Schedule and coordinate all work with other trades, and the vapor barrier subcontractor and roofer in particular, so neither the vapor barrier nor insulating fill is left exposed to the elements, to insure roofer is able to, and will, immediately cover the fill with roofing.
- C. Remove and replace any insulating fill that has become wet from being rained on as a result of misscheduling of work with roofer, inadequate planning or attention to weather forecasts or similar causes. In the event roofer has

assured fill subcontractor of roofing installation schedule and the roofer does not so perform (unless weather conditions do not permit roofing), fill subcontractor will not be held responsible for wet fill replacement. Remove all material from deck that has been saturated or soaked by water, or permitted water to penetrate and stand on deck or vapor barrier. No wet material will be allowed to remain.

D. Guarantee material to have sufficient resilience to prevent lateral pressure on surrounding walls or intersections with other materials.

E. Provide and install perforated galvanized metal and pea gravel at drains.

### 3.4 INSTALLATION OF OPTIONAL RIGID ROOF INSULATION

A. Mopping over concrete decks: Use not less than 25 lbs of steep asphalt per square for each mopping, uniformly coating surface. Mop vapor barrier and first layer of insulation.

B. Installing Insulation: Install only dry insulation and only as much insulation as can be covered same day with roofing. Over base sheet vapor barrier, set in hot steep asphalt mopping. Over fire retardant vapor barrier, embed in parallel courses, with end joints staggered. Sides and ends to be in moderate contact to form minimum crack. Use care in installing and working over insulation to prevent damage and replace damaged units.

C. Roof Drains and Scuppers: Lay in 36" square of  $\frac{1}{2}$ " thinner insulation, sized to receive lead flashing and to form a slight sump, as precaution against build up to put drain above surrounding level. Level edges of sump.

D. Cut-Offs: Do not install permanent cut-offs except at edges and curbs unless specifically required by manufacturer. Install temporary water cut-offs each time work is suspended (daily) and remove prior to proceeding with work.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all preformed metal siding, insulated and uninsulated and associated metal trim (not flashing).

C. Related work specified elsewhere:

1. Unit Masonry: Section 04200.
2. Structural Steel and Miscellaneous Metals: Sections 05120, 05500.
3. Sheet Metal: Section 07600.
4. Louvers: Section 10200.

1.2 SUBMITTALS

A. Shop Drawings: Submit fabrication and erection drawings in accordance with Section 01300.

1.3 HANDLING, DELIVERY, STORAGE

A. Handle, transport and store at the job site in a manner that will avoid damage or deformation. Only minor surface scratches or abrasions as determined by the Architect will be allowed to be corrected in the erected panels. Damaged panels shall be discarded.

## PART 2: PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The products specified herein are those of Walcon Corporation, Inc., to establish standards of quality, design profile and workmanship. The equivalent products of Inland-Ryerson Construction Products Company, HH Robertson Company, or approved equal will be acceptable.

2.2 COMPONENTS

A. Interior Liner.

1. Metal for the liner panel shall be formed from steel sheets conforming to ASTM A245-64. The steel shall have received before being formed, a metal protective coating of zinc suitable for field painting conforming to ASTM A525-65T wiped coating and to Federal Specification QQ-S-777c Type I, Class e.

2. Design of the liner panel shall have 1-3/8" deep lap flanged inter-

locking side joints with shop caulked vapor seal. The interior joint of these liner panels shall have a tight metal to metal joint.

3. The width and gauge of the liner shall be as required to contribute to the combined action of the panel to resist the designated load and deflection criteria.

4. The finish of the interior surface of the liner panel shall be as fabricated.

B. Metal Subgirts (and furring) shall be roll-formed from metal coated steel into the required shape to properly receive all panel fasteners and produce the combined action between the face sheet and the liner to meet the designated design loads and deflections.

C. Insulation shall be of a glass fiber type, 1½" thick (or as required to produce specified "U" factor) conforming to Federal Specification HH-I-521-C, Type 1, Class A.

D. Hidden Clips for fastening exterior face to subgirt shall be coated steel. Clip design shall effectively function to meet all design requirements of the total panel assembly.

E. Exterior Face.

1. Design shall be nominal 1½" deep having a module of 12" width and be profile Rol-Line F or Styline as indicated. Side joints shall have concealed male and female lips so as to provide a continuous protected interlocking sealed joint, allowing for expansion without opening to the weather. Neither exposed fasteners nor buttonpunching shall be required nor permitted. End joints shall be either counter-sunk or butted with lap strips.

2. Exterior metal shall be fabricated from steel. The gauge shall be as required to meet the load and deflection criteria, in conjunction with the minimum metal thicknesses that might be required for the specific finishing process.

3. Exterior color shall be premium two-coat Custom color as selected by the Architect.

4. Exterior finish shall be Baked Enamel. A minimum three coat field paint finish will be acceptable in lieu of factory baked enamel finish. Field painting shall be accomplished under this Section 07411.

### 2.3 ASSEMBLY OF COMPONENTS

A. Assembly of interior and exterior elements shall be preformed by the manufacturer in the shop or field at the option of the manufacturer.

### 2.4 PANEL DESIGN CRITERIA

A. Wind Load - 30 psf single span.

B. Deflection - L/180 maximum.

C. Fasteners - concealed at exterior; special at interior.

D. U. Factor (insulated panels): .15.

### PART 3: EXECUTION

#### 3.1 FIELD ERECTION

A. Field erection of the shop-assembled panel or field erection and assembly of the field-assembled components shall be performed by the manufacturer's erection division or by its sub-contractor or by a licensed service dealer in accord with approved assembly and erection drawings.

B. Inspection and Correction of support: The alignment of all structural steel girts or other steel supports to receive wall panels shall be examined by the erecting contractor before commencing installation. Any misalignment of such steel or arrangements not within the usual AISC tolerance shall be reported to the Contractor and erection shall begin only after such necessary corrections have been made to properly receive the wall panels.

C. Flashing, Accessories and Trim: Installation of flashing, accessories and trim required around windows, doors, etc. shall be performed in a neat workman-like manner and such components shall be fastened with screws of a material type and nominal size consistent with the metal wall construction.

D. Touch up painting: Touch up exterior facing panels that have been scratched or abraded in erection. Only touch-up allowed will be that of minor finish nature as determined by the Architect.

F. Apply neoprene compression seals relating to insulated metal siding using adhesive at neoprene to metal joint. Clean adjacent surfaces of adhesive and masking. Foam shall be compressed 25% minimum at completion.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all built-up bituminous roofing (including patching existing roofs) and related rigid roof insulation, including insulation and vapor barrier at sheet metal roofs.

C. Related work specified elsewhere:

1. Membrane Waterproofing: Section 07110.
2. Bituminous Dampproofing: Section 07150.
3. Roof Insulation: Section 07241.
4. Building Insulation: Section 07210.

D. Not furnished under this section, but built-in under this section:

1. Metal Roof Flashing and Trim which is built into plies of roofing membrane: Section 07600.
2. Roof Drains: Division 15.

1.2 GENERAL INFORMATION AND REQUIREMENTS

A. Information in this Article is intended to complement and clarify the intent of the drawings, but do not construe as outlining all required work. Provide all materials and installation to complete the work. P & G used herein means pitch and gravel construction.

B. Roof Decks: Concrete.

C. Vapor Barriers: Provide vapor barriers at all roof areas. Install vapor barriers under insulating fill and under rigid insulation used in conjunction with all types of roofing.

D. Bonded Construction: Construct built-up membranes as for 20 year bonded roof. Bond is not required; provide specified guarantee instead.

E. Roofs: Over concrete provide: vapor barrier; time and schedule to permit installation of sloped gradient insulating fill under Section 07241, built-up P&G roofing.

F. Flashing:

1. In cooperation with sheet metal subcontractor (or others, as appropri-

ate) build-in any metal flashing (furnished under other Sections) which is inserted into plies of roofing.

2. Provide and install all plastic sheet under metal copings, roof edges and similar locations.

G. Compatibility: Where any "plastic" flashing or membrane is to be built-into, or be in contact with, built-up membranes, verify the compatibility of the proposed "plastic" flashing with the built-up membrane materials. Do not use any "plastic" flashing that is incompatible, will soften or cause deterioration to plastic or built-up membrane.

H. Installation over insulating fill: Coordinate and schedule all work with insulating fill subcontractor. Install vapor barrier just prior to and in cooperation with fill subcontractor. Review requirements of Section 07241. Install membrane immediately after insulating fill has cured, to prevent moisture on and in fill.

I. Notice: Give notice to University when materials are delivered to permit examination and testing. Give at least 7 days notice before starting any work to permit inspections to be scheduled.

J. Certificate: Prior to starting work, provide certificates from the manufacturers that the materials being provided to the job are in accordance with the specified requirements.

### 1.3 FOLLOW-UP INSPECTIONS AND SERVICE

A. Project Completion: Just prior to acceptance of entire project, roofer shall inspect entire roof, remove all debris, nails, wire, cut metal and re-spread gravel over thin or bare spots. Provide additional gravel as required. Remove any drips of bitumen. Also perform this service as specified below under guarantee, at 12, 24 and 36 months. Send written confirmation to Owner and Architect when such services have been performed. Any "ridging", blisters and similar defects shall be cut open and repaired.

### 1.4 GUARANTY AND INSPECTION SERVICE

A. General: Roofing bond not required. Provide written guaranty and maintenance agreement as specified hereinafter. Guaranty shall be signed by applicator and General Contractor.

B. Built-up Membrane: Guarantee all built-up membranes and composition flashing work and provide three year inspection and maintenance service, all in accordance with following guaranty form. Guarantee to start at acceptance of entire Project under the general contract. Furnish two executed copies of guaranty to Architect.

### BUILT-UP MEMBRANE AND FLASHING GUARANTY - MAINTENANCE SERVICE

WHEREAS \_\_\_\_\_ (firm name of roofing subcontractor) \_\_\_\_\_,  
of \_\_\_\_\_ (firm address) \_\_\_\_\_.

herein called the Roofer, has furnished and applied all built-up membranes and composition flashing in accordance with Contract requirements and as required for roofing material manufacturer's Twenty Year roofing construction on the Project as described below:

Project:  
Location:  
Owner:  
Area of Roofing:  
Date of Project Final Acceptance:  
Manufacturer of Roofing Materials:

NOW THEREFORE, Roofer guarantees to the Owner subject to the limit stated hereinafter, to maintain at Roofer's own expense, all work weather and water-tight as necessitated by normal wear and tear of the elements or by defective materials or workmanship, for a period of three years from date of project final acceptance, and said guarantee shall extend to \_\_\_\_\_ (date) \_\_\_\_\_.

EXCLUSIONS: This Guaranty does not cover and Roofer shall not be liable for the following:

1. Damage to the built-up membranes and flashing as caused by fire, lightning, tornado, hurricane, gale, hailstorm or other violent occurrences of the elements resulting in physical damage to the roof.

2. Damage to built-up membranes and flashing as caused by: significant settlement, distortion or failure of deck, walls or foundations of building, or by substantial building movement; any of which is sufficient to be the direct cause of roof damage.

3. Damage to building or its contents.

4. Damage to built-up membranes and flashing due to mechanical abrasion or abuse not caused by the roofer.

REPAIRS: Owner shall promptly notify Roofer, in writing, of need for repair of built-up membranes and flashing and provide him opportunity to inspect the Work. Roofer shall immediately inspect the work. Following such inspection, roofer shall, at his own expense, make such repairs as are required by this Guaranty.

In case required repairs are not covered by this Guaranty, after having obtained Owner's consent in writing, Roofer shall make such repairs at Owner's expense in accordance with specifications and procedures as established by Roofer and the manufacturer of roofing materials. Following said repairs, this Guaranty shall thereupon remain in effect for the unexpired portion of the original term, provided repairs authorized by the Owner are intended to result in a membrane equivalent to the membrane installed under the original requirements. If Owner does not so consent and repairs are made by one other than the Roofer, this Guaranty shall terminate for those parts of the work affected by the repair.

In case any work is to be done over membranes, including modifications, al-

terations, extensions or addition to membranes, and including installing vents, platforms, equipment, bracings or fastenings, aerials, sign frames, water towers, fans and similar work, Owner shall first notify the Roofer and give the Roofer opportunity to make recommendations as to methods necessary to safeguard against damage to work covered by this Guaranty. Failure of Owner to notify Roofer or failure to follow methods recommended by him shall render this Guaranty null and void to extent such failure should result in damage to work covered by Guaranty. If work is performed in accordance with Roofer's recommendations, whether by Roofer or not, the Guaranty shall remain in full force.

In the event that (1) Owner notified Roofer of the need for repair of membranes or flashing and, (2) after inspection it is determined the repairs are clearly not the responsibility of the Roofer under this Guaranty and (3) the Owner does not authorize repairs by the Roofer, (4) the Owner may make such repairs as he deems necessary. In such event, the Roofer will not be held responsible for the repairs nor damage to the membrane or flashing as may be affected by the repairs and the Guaranty shall terminate for said affected parts. All other areas and terms of the Guaranty shall remain in effect.

The Roofer will not be held responsible for damage to membrane or flashing caused by or resulting from using the surface as a storage area, recreational surface, unnecessary walkway or other similar purposes for which the surfaces were not intended.

INSPECTION AND MAINTENANCE SERVICE: Roofer agrees without further notice of Owner to reinspect the work at time intervals of 12 months, 24 months, and 36 months after date of acceptance. If it is determined that there are defects in the built-up membranes or flashing, then Roofer will make such repairs as are necessary to remedy said defects within the scope of his responsibility under the terms of the Guaranty. At time of this inspection, Roofer agrees to regravell and apply bitumen to all bare or dry areas, cut and repair blisters or ridges, recoat bare or dry flashing, remove all debris on membranes and perform similar work to place built-up membranes and flashing in proper condition for a minimum of 20 years of service. However, the guarantee of roofing does not extend beyond the limits stated herein.

If Roofer fails to provide inspection and maintenance service within 90 days of the above required dates, weather permitting, he agrees that period of Guaranty shall be extended by the number of days in excess of 90 that inspection service is delayed, unless prior written approval to delay is obtained from Owner.

Inspection and maintenance service shall be performed by Roofer in presence of representative designated by Owner and Roofer shall submit a written report of inspection and work to Architect and Owner. In the event the Roofer does not perform the services and remedial work required by this Guaranty, the General Contractor shall cause the work and services to be done by a reputable roofer approved by the Architect and Owner.

IT WITNESS WHEREOF, Roofer has caused this instrument to be signed and sealed by its duly authorized officer this \_\_\_\_\_ date of \_\_\_\_\_, 19\_\_\_\_.

By:  
Title:  
For Roofer (roofing subcontractor)

By:  
Title:  
For General Contractor

Seal:

### 1.5 DELIVERY, STORAGE, HANDLING

- A. Package, deliver and store materials in a manner that will avoid damage.
- B. Store all materials off the ground and keep under waterproof covering, approved by University. Do not allow covering to be torn, displaced or otherwise damaged. Store rolls by stacking on end, with adequate platform and clearance to prevent penetration of moisture from grade. Do not pile roof materials to such weights as will damage deck or insulation.

### 1.6 SUBMITTALS

- A. Test Reports: Submit test reports on all materials tests. See Article 3.7.
- B. Samples: Submit samples of the following for approval of the Owner and Architect.
  - 1. Roofing gravel.
- C. Guarantee: Submit 2 copies of roofing guarantee as specified in Article 1.4 herein.
- D. Certificate: Submit 2 copies of certificates specified in Article 1.2.K herein.

## PART 2: PRODUCTS

### 2.1 MANUFACTURERS OF BUILT-UP MEMBRANE

- A. Provide materials of best grades of Barrett, Koppers, or approved equal. Strictly adhere to manufacturer's requirements for twenty years roofing and flashing for type of deck and other conditions, or as specified herein, whichever requirement is the most rigid or demanding. Note that certain requirements herein may be in excess of normal bonded roof specifications and such additional requirements shall be provided. As reference, Barrett may be named. For all built-up membrane materials, provide products of one manufacturer.

### 2.2 ROOFING AND PLASTIC FLASHING MATERIALS

- A. Provide materials conforming to ASTM standards, where they apply, as minimum requirements, as well as equal to Barrett's materials.
  - 1. Base Sheet: 40-45 lb. coated base felt equal to Barrett.
  - 2. 15 lb. Asphalt Felt: ASTM-226, with Underwriter's label, 15 lb/100 sq ft.

3. 15 lb Tarred Flet: ASTM D227, with Underwriter's label, 15 lb/100 sq ft.
4. Asbestos Finishing Felt: ASTM D250, 15 lb/100 sq ft.
5. Reinforced Asbestos Base Flashing: Barrett AB-20, or approved equal.
6. 5 lb. Sheathing Paper: Equal to Barrett's 5 lb/100 sq ft.
7. Primer for Roofs Applied Directly to Concrete Slabs: ASTM D43-41.
  - a. For coal-tar pitch roofs.
  - b. For asphalt roofs: ASTM D41.
8. Steep Roofing Asphalt: ASTM D312, Types II, III or IV as appropriate for slopes.
9. Roofing Asphalt: ASTM D312, Type I.
10. Coal Tar Pitch: ASTM D450, Type A, straight run, high bitumen coal tar pitch.
11. Vapor Barrier: Over concrete decks, provide 40-45 lb base sheet vapor barrier. At metal decks, provide UL labeled fire retardant vapor barrier and adhesive for Class I construction, using Lexsuo plastic sheet and adhesive system. Equivalent systems of "Reflecto-Barrier" (Carey), Plastic Compound Company, B.F. Goodrich or approved equal will be acceptable.
12. Cap Sheet for Base Flashing: 90 lb. Granular surfaced roofing, ASTM D249, or D371.
13. Plastic Cement: As recommended by roofing manufacturer, minimum standards Federal Specification SS-C-153, Type I or II as compatible with roofing.
14. Plastic Flashing, light: Minimum 30 mil thickness, self extinguishing, flexible, homogeneous, waterproof, impermeable sheeting. BFG Flexible Vinyl Water Barrier, Nervastral 300, Sonneborn 30 mil Hydrocide Vinylseal, or approved equal. 30 mil thickness flashing may be used as cap sheet under metal at roof control joints, and similar locations where covered by metal or providing secondary protection, including under metal copings.
15. Plastic Flashing, heavy: Minimum 55 mil thickness, self extinguishing, homogenous, waterproof, impermeable sheeting, flexible at low temperature (-20°) BFG Flexible Vinyl Flashing, Gates Contourflash, Nervastral 600, Sonneborn Hydrocide Vinylseal, or approved equal. For applications built into or in contact with built-up membranes, verify compatibility with bitumen. Provide 55-60 mil flashing at expansion joints, wherever flashing may be exposed to weather and wherever flashing will be subject to hot mopping.
16. Lead flashing pan: 4 lb. sheet lead, 36" diameter or 6" outside drain body, whichever is larger.
17. Sealant: G.E. silicone Construction Sealant, or Dow-Corning Silicone Sealant.

18. Gravel: Water worn gravel, 1/2" to 5/8" in size, washed, clean, dry, generally rounded aggregate and suitable for use on roofing, ASTM D1863 (no slag).

19. Roof Drain Flashing: 4 lb lead, minimum 36" diameter or minimum 6" beyond drain body, whichever is larger, Federal Specification QQ-L-201F, Grade B or better.

### PART 3: EXECUTION

#### 3.1 STANDARDS FOR INSTALLATION

A. Workmanship: Conform to best practice and accomplish by using only skilled mechanics. Exercise special care at openings through roof and at roof edges. SPILL NO ROOFING MATERIALS ON BUILDING OR OTHER MATERIALS. Spilled materials on exposed surface will result in roofer repairing, resurfacing or replacing the stained work. Requirements for installing roofing applies to similar operations for vapor barrier and insulation work. See Section 01010 for conditions for working on roof and over membranes, and Section 01500 for Temporary Heat requirements.

B. General Responsibility: Perform no work in conflict with, contrary to, or below the standards established by roofing materials manufacturer. After starting work, roofer is responsible for complete water integrity of the membranes which will insure a satisfactory roof life of not less than 20 years. Therefore, roofer shall observe the following:

1. Do not apply membranes or other work under any conditions which are not proper and in best recommended practices, including surfaces or weather.

2. Examine roof decks and other surfaces with prime contractor for suitability of surfaces and not proceed until corrections have been made where necessary (start of work means acceptance of deck and conditions by the roofer).

3. Do not overheat bitumens and in event of accidental high temperatures, discard entire batch.

4. Review all drawing and specification requirements and establish control and test procedures to insure compliance.

5. Exercise care to insure adequate quantities of materials are used.

6. Maintain competent foremen continuously supervising the work, with authority to discard unsuitable materials or remove unsatisfactory workmen.

7. Supervise installation of, and be responsible for seeing that ventilators, drains, curbs and other work is properly set and roof is not damaged; make roof and flashing repairs as necessary; advise University and Prime Contractor of any potential leaks in work of others.

8. Resolve questionable installation work prior to proceeding.

9. Inspect deck with University Representative prior to starting work.

### 3.2 PREPARATION

A. Surfaces: Properly prepare all surfaces to provide and insure best installation. Decks and other surfaces must be clean and dry. Sweep and clean areas thoroughly before starting work. Do not start work during threatening weather. Notify General Contractor of any areas unsuitable for roofing. Do not proceed over frosty or damp surfaces or until deck is proper. Remove snow from decks and dry thoroughly before starting.

B. Deck Smoothness: Check deck for smoothness and for suitability to receive vapor barrier and insulation. Refer to Section 03300 for required concrete finish. Install no barrier or insulation over deck with ridges and/or depressions that will result in unsatisfactory base for work under this section. Have all corrections made to provide deck that meets project requirements and roofer's approval. Start of work means acceptance of deck and conditions by the roofer.

### 3.3 INSTALLING VAPOR BARRIER

A. Extent: Provide vapor barrier at all decks with heated spaces below, including under all rigid roof insulation if option is exercised and under insulating gradient roof fill.

B. Concrete Decks: Prime decks with asphalt primer.

C. Base Sheet Vapor Barrier: To the concrete deck, apply heavy full mop coat of steep asphalt into which, while hot, imbed one ply of 40-45 lb. base sheet. Lap each joint 4" and mop full width of each lap with steep asphalt. Broom to insure complete embedment of sheet. If necessary to insure base sheet lays flat and smooth, warm the rolls and/or the sheet as it is laid. University will inspect vapor barrier before insulation is installed and any membrane not flat will be rejected. At all pipes, drains, opening curbs, parapets, walls and similar projections through vapor barrier, flash with two plies of asphalt-saturated fabric and three courses of plastic cement, applied alternately, or flash with 55-60 mil plastic flashing. Carry flashing up to height of insulating fill, or 8", whichever is highest.

D. Insulating Fill Locations: Install vapor barrier just prior to placing of fill. Watch fill operations to see membrane is not damaged. Seal vapor barrier to adjacent abutting surfaces (i.e. Parapets, curbs) to prevent vapor penetration into fill, by placing heavy bead or trowelled fillet or plastic cement at edge of vapor barrier. As insulating fill is completed, immediately roof the area to prevent fill from becoming damp or wet. Advise fill subcontractor when threatening weather will prevent placing of built-up membrane.

E. Edges: Install vapor barriers to effectively block vapor transmission into insulating fill or under built-up membrane by either sealing to abutting surfaces or installing vapor barrier at edges so vapor pressure exhausts positively to atmosphere. Wherever necessary, seal perimeters and at other penetrations with plastic cement. See membrane work for other applicable requirements, including bitumen heating.



### 3.4 INSTALLING BUILT-UP P & G ROOFING

A. General: Coordinate schedule and work with insulating fill operations to apply membrane over fill immediately. Use only dry, undamaged felts and properly heated bitumen. For first ply of all built-up membranes, use 15 lb. tarred felt. Complete membrane in one operation, without phases. Lay all plies "Shingle fashion" at one time (no "combination" laying), except for first ply if specifically recommended by manufacturer. Spread bitumen by mopping to full coverage of surfaces. NOTE: If water has been used in placing fill, allow to evaporate prior to roofing area.

B. Protection: Keep all felts covered, clean and dry. Perform all work, including use of equipment to transport materials, to prevent damage to fill, insulation or deck. Roofer shall do all preparation work, take all precautions and be responsible for preventing any bitumen dripping onto or into building.

C. Heating: DO NOT OVERHEAT BITUMEN: Discard any overheated material. Do not use on project. Do not heat pitch over 400° and apply to surface above 350°. Do not heat asphalt over 450° and apply to surface above 400°. (If manufacturer recommends lower heat temperature, follow manufacturer's recommendations). Temperatures apply to membrane, vapor barrier and insulation work. Roofer shall keep accurate thermometers at site for use of workmen and Owner's representative. (Thermometers shall not be built-in kettle thermometers.)

D. Membrane Plies: Install at least 4 plies of saturated tarred felt, lapping each 27½" over preceding felt and mopping each felt uniformly and fully so in no place does felt touch felt. Use minimum 30 lbs of pitch per ply per 100 sq ft. Lay all felts without buckles and wrinkles and broom in each ply to form intimate contact over entire surface so plies are completely bonded together with bitumen.

E. Flood Coat: Over entire surface pour uniform coating of bitumen, using 75 lbs of pitch per square. Apply within two days of completion of membrane but not until cut tests have been taken.

F. Gravel Surface: At all built-up membranes, while flood coat bitumen is still hot, uniformly spread and imbed gravel. At roofs use not less than 400 lbs per 100 sq ft.

G. Control Joints: Building expansion joints and membrane control joints divide the membrane into smaller areas. If, in roofer's or manufacturer's opinion, additional membrane joints are considered advisable, provide such additional joints without additional cost. Construct control joints and expansion joints as indicated, watertight.

H. Temporary Cut-offs: at day's end, turn roofing felt down over exposed edges of insulation and mop solidly so that water cannot penetrate below insulation. Remove the next day when roofing proceeds.

I. Drains: At drains, build-in sheet lead flashing pan. (Roof drains, connected to sewer, are installed by plumber, built-in by roofer.) Set and built-in drains, plumbing vents and similar items. Keep drains free of pitch and gravel

so strainer can be removed. At roof drains in sloping roofs, build in a 12 gauge galvanized iron ring, 1" high, around the drain to retain gravel. Ring provided under Section 07600. Build flange into membrane, using plastic cement.

J. Vertical Surfaces: Where membranes are continuous over a vertical or steep sloped surface, install all plies in full uniform trowelled coating of plastic cement and apply plastic cement top surface approximately 1/8" thick. At these areas, in lieu of built-up membrane, the 55-60 mil plastic sheet membrane may be provided instead, built into membrane a minimum of 8".

K. Obstructions and Roof Penetrations: Perform and install all work around openings with plastic cement, including drains, vents and similar items. Double felt strip flanges into membrane. At pipes, conduits and similar round items (without flanges) which penetrate roof, install plastic flashing sealed to obstruction and carried out onto membrane at least 8", built into membrane. Construct all work to insure no pitch drips into building.

### 3.5 INSTALLING FLASHING

A. General: Examine all drawings, including mechanical and electrical wrk for general indication of curbs, openings, skylights, vents, drains, joints and similar work, as well as types of flashing work. Drawings are not represented as indicating all obstructions or features that may occur nor do details indicate all requirements or methods of flashing work. Metal flashings are provided under Section 07600.

B. Vertical Surfaces, Built-up Membranes: At parapets, intersections of horizontal surfaces to walls, curbs and similar vertical surfaces with cant strip, carry all felts of built-up membrane up cant and cut off evenly. Either full height of curb or up 8" minimum apply five layers of alternating plastic cement and four layers of flashing felt. Cover entire surface with plastic cement and imbed surfaced cap sheet. Nail tops of flashing plied to backup with tin discs. Seal entire top edge of flashing plies with liberal application of plastic cement. At Roofing Subcontractor's option in lieu of multiple ply flashing, flashing at vertical surfaces shall be 2 ply type flashing conforming to Kopper's Specification No. 108 using 1 ply asbestos finishing felt and 1 ply reinforced asbestos base flashing each ply set in plastic cement and plastic cement coating over top ply. When flashing must be installed in cold weather, with the specific approval of the Architect, hot steep asphalt may be substituted for plastic cement to imbed the cap sheet (final ply) by using a heavy hot mopping on the surface of the ply under the cap sheet and also over the surface of the cap sheet.

C. Membrane Control Joints: Provide joints to divide roofing membrane into smaller areas as indicated. Install flashing as for abutting vertical surfaces (4 plies and cap sheet). Install plastic flashing over top of curb before metal cap flashing is set (may not be indicated on details), extending down over surfaces cap at least 3" each side, set in plastic cement and tacked.

D. Expansion Joints: Generally flash as for other vertical surfaces, both sides of joint. In addition, over top install plastic flashing cap (may not be indicated on details). Also install plastic flashing at bottom of joint cavity. Plastic flashing shall have loop of surplus material to permit building movement.

E. Equipment Curbs: Construct as detailed. Seal all penetrations through flashing at supports. Flash as for other vertical surfaces and install 55-60 mil plastic sheet.

F. Scuppers: At built-in scuppers, carry all roofing plies under the metal as detailed, set in plastic cement. Set metal in plastic cement. Over metal, install three plies of flashing strips, extending 4", 8" and 12" beyond metal, with all strips set in plastic cement.

G. Metal Roof Edges: Construct as follows to fit general details indicated, except that additional requirements of the manufacturer shall be followed when such requirements may exceed the following:

1. Install keeper for metal gravel stop.

2. Carry membrane felts over roof edge, all plies set in plastic cement for last 6 inches to edge then dry to bottom of fascia and nail through discs. Cover all nails with dab of cement.

3. Have metal gravel stop installed immediately and have metal set within 2 days after roofing plies are installed but before flood coating. (Metal is a non-watertight protective cover only, with complete water integrity accomplished by roofing.)

4. Set gravel stop in full bed of plastic cement and nail down inner edge. Cover all nails with dab of cement. Over metal install three plies of flashing strips, extending 4", 8" and 12" beyond metal, with all strips set in plastic cement.

H. Metal Base Flashing: Build in metal base flashing as recommended by roofing manufacturer. Double felt strip aprons prior to flood coating.

I. Plastic Flashing Installation: Accomplish plastic flashing work by following manufacturer's directions to maintain watertight integrity of flashing material and installation. Lengths to be as long as possible by rolls of material. Ends shall be lapped minimum 2", and seal entire lap with adhesive (not pitch or plastic cement). Wipe talc off material and clean free of other residue. Where plastic flashing is sealed to plastic flashing (as end laps), rub surfaces with cotton soaked with MEK. When flashing becomes tacky, press together and roll (or otherwise compress) the joint to form firm bond. No pitch or plastic cement permitted. If temperature is below 60°F warm the sealed joints.

J. Pitch Pans: Install metal pitch pockets or pans as may be required, minimum 2" high with minimum  $\frac{1}{2}$ " clearance at each side of obstruction. Fill with pitch, as specified under 2.2.A.10 herein.

K. Miscellaneous: Install all flashing felts, including at parapet, curbs, vertical surfaces and flashing at parapet top with full coating of plastic cement and cover with cap sheets in plastic cement. Cooperate with sheet metal contractor to allow sufficient time for setting metal work. Install all flashing

as recommended by manufacturer for twenty year bond, or as specified above, whichever is the most rigid requirement.

### 3.6 FIELD QUALITY TESTING

A. Cut Tests: In locations directed by Owner, before flood coating or gravel is placed, roofer shall cut one 12" by 12" sample of built-up membrane construction, for each five squares of roofing. Make cuts as work starts in any area to provide an early indication of roof work. Make cuts in presence of Owner. Weigh samples on accurate scale and keep record. Underweight samples will result in rejection and replacement of area to extent determined by Owner. (Adding a ply to correct deficiencies will not be permitted.) At least 2 samples shall be submitted to an independent testing laboratory, selected by the Owner, for testing and evaluation, with tests paid for by the Owner.

B. Patching Cuts: If cut sample indicated compliance, reset the sample in the area cut out. If it does not comply, turn over to Supervising Engineer and cut felts to match the membrane construction, lay in cut out with plastic cement between each ply. Over top of patch, install four plies of felt and five mop-pings applied over patch, extending 4", 8", 12" and 16" beyond patch, respectively.

C. Material Tests: In addition to above cut samples for weight and visual inspection, roofing contractor shall provide and pay for two tests each on bitumen and felt by independent testing laboratory, for material conformance. Take test samples when directed.

### 3.7 FOLLOW-UP INSPECTIONS AND SERVICE

A. Project Completion: Just prior to acceptance of entire Project, roofer shall inspect entire roof, remove all debris, nails, wire, cut metal and re-spread gravel over thin or bare spots. Provide additional gravel as required. Recoat any bare or dry areas. Remove any drips of bitumen. Any "ridging", blisters and similar defects shall be cut open and repaired.

B. Three year inspection: Provide the inspection and services for three years, in connection with specified guarantee.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 10101, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all sheet metal work.

C. Related work specified elsewhere:

1. Unit Masonry: Section 04200.
2. Miscellaneous Metal: Section 05500.
3. Membrane Waterproofing: Section 07110.
4. Metal Siding: Section 07411.
5. Built-up Bituminous Roofing: Section 07510.
6. Field Painting: Section 09900.

D. Furnished under this Section, built-in under other Sections:

1. Sheet metal built-in masonry and similar locations by other trades: built-in under appropriate sections.
2. Sheet metal for membrane waterproofing: Built-in under Section 07110.
3. Sheet metal for roof flashing and trim: Built-in under Section 07510.

1.2 GENERAL LOCATION OF TYPES OF SHEET METAL WORK

A. Provide all required sheet metal work, of the general types and character outlined herein. Provide soft stainless steel (S.Stl.), color finished metal (C.F.) protected metal and copper where noted or specified and galvanized iron (G.I.) for all other metal work. It is intended that non-replaceable metal work (i.e.: cannot be removed from construction or extends down into "concealed" areas, such as below plaza) be soft stainless steel. Metal work in contact with, or draining over exposed faces of precast concrete except reglet shall be color finished metal. Consult Architect in event of question of location.

1. 0.012" stainless steel joint cover and counterflashing at below grade slab, curbs and joints.
2. 0.015" stainless steel built-in flashing - counter flashing receiver at non-replaceable locations.
3. 20 ga. G.I. cover - counter flashing at curbs and membrane joints, such as: curbs, roof control joints, and similar replaceable curb work.

4. 24 ga. G.I. reglets, flashing receivers and counterflashing where roof flashing abut parapets, walls and similar vertical surfaces.

5. 20 ga. G.I. metal coping cover at equipment curbs, sills, etc. at sill over wood.

6. 12 ga. G.I. gravel stop ring around roof drains at roofs where slopes occur.

B. Provide all other sheet metal work and related materials of similar nature, for flashing, counterflashing, inserts or reglets at masonry (but not at concrete), curbs, enclosures, caps and all other sheet metal except as may be provided under other sections.

### 1.3 SUBMITTALS

A. Samples: Submit full size samples of each type of roof edge, coping and typical counter flashing, prior to fabricating metal for the Project. Show joints for each type.

B. Shop Drawings: Submit fabrication and erection drawings of all sheet metal work including full size details, prior to fabrication. Show locations of proposed joints at exposed metal work. Submit in accord with Section 01300.

### 1.4 DELIVERY, STORAGE, HANDLING

A. Deliver, handle and store at the jobsite in a manner that will avoid damage. Scratched, dented, or deformed metal items will be rejected.

## PART 2: PRODUCTS

### 2.1 MATERIALS

A. Galvanized Sheet Metal: ASTM A525 and ASTM A361, 1.25 oz. class (G90) by Armco, US Steel, Wheeling or Toncan Metal, or approved equal. Prime on both sides. Gauges of metal as specified, shown on drawings and required to provide highest quality installation.

B. Stainless Steel: "Soft" chrome-nickel stainless steel, "Micro Flex", of Washington Steel Corporation, or approved equal, dull matte finish, thickness as specified. Prime exposed metal prior to furnishing to the job, for final field painting.

C. Paint:

1. Asphaltic coating: Coat metal (G.I., S.Stl. or Copper) built into roof type membranes, or under insulation, with bituminous paint on parts to be built in. Prime back side of copper with heavy coat (or two coats) of asphaltic paint wherever it laps over or comes in contact with other metal or where it is built into masonry.

2. Galvanized metal: For all other G.I. flashing (not built into roof-

ing) thoroughly clean metal of all dirt, grease, oil, or other residue, properly treat surface to insure adhesion, then apply one full coat of zinc dust primer on both sides of metal before installation. Primer to be Type 1, in accordance with Federal Specification TT-P-641-D with 80% metallic zinc dust. No substitutions. See Article 2.2 below.

3. Stainless Steel: Paint all exposed parts of S.Stl. with primer recommended by manufacturer, after thoroughly cleaning metal. Apply in shop prior to delivery to job. See Article 2.2 below.

#### D. Fastenings:

1. General: Provide appropriate and recommended type and size of non-rusting fastenings for all metal to insure: proper and permanent alignment; metal remaining permanently in place; restricted movement; permanently tight joints. Provide screws or rivets at all soldered joints to take the stresses. No nails to be used where exposed. Where exposed fastenings are required, provide screws. Fastenings shall penetrate wood a minimum of 3/4".

2. Stainless steel: Stainless steel screws and nails.

3. Galvanized metal: Hot dip zinc coated steel nails and screws, except screws holding removable counter flashing shall be stainless steel.

4. Watertight washers: For screws at coping caps, roof edges, tops of curbs and similar locations, provide neoprene washers under the head to insure watertight hole.

#### E. Solder:

1. Stainless steel work: 50-50 tin and lead alloy for general work, except use 60-40 or 80-20 at exposed unpainted work. Use strong acid type flux as recommended by metal manufacturer.

2. Other metal work: 50-50 tin-lead alloy.

#### F. Joint Sealer, Mastic and Miscellaneous:

1. Roofer's Mastic: Plastic cement as specified for roofing, Section 07510.

2. Concealed sealant (bedding sealant): Tremco Curtainwall Sealant, Polyisobutylene-butyl type, or approved equal.

3. Caulking compound-sealant: As specified for sealant under Section 07900.

4. Plastic flashing sheets: 30 mil thickness, as specified under Section 07510.

### 2.2 FABRICATION WORKMANSHIP

A. General: Provide metal free from holes, waves, buckles, pinch marks and

other defects. Imperfect metal will be rejected and shall be replaced. Coping covers and roof edge covers will be rejected if not straight and level.

B. Peeling Paint: Thoroughly cleaned metal is a requirement prior to priming to insure proper provide adhesion. Paint that peels or blisters from metal work (primed under this section) at the line of primer and metal, within two years after acceptance by Owner, shall be basis for rejection of painting and this subcontractor shall brush, reclean and repaint such work as directed at the expense of this subcontractor. If repainting is required, two coats of paint shall be provided and entire metal will be cleaned and repainted.

## PART 3: EXECUTION

### 3.1 WORKMANSHIP

A. General: Conform to best practice, accomplish by using skilled mechanics, in accordance with Sheet Metal Contractor's Association Handbook and Recommendations and to details shown. Provide metal work that is substantial, securely fastened, neatly installed, with clean sharp breaks, water and weatherproof at exterior and below plaza locations. At roof and below plaza locations, provide metal work to meet roofer's requirements and approval for twenty year bonded type roof. Insulate between dissimilar material with asphalt paint or other approved insulator, such as plastic sheet.

B. Verify conditions: Prior to starting work, verify that all nailers, etc., are true to size and line and securely anchored. Notify General Contractor of unsatisfactory work and do not proceed until corrections are made so straight, level, plumb and properly sized work results. Verify dimensions in field to provide proper and accurate fit.

C. Dimensions: Carefully form and install metal work, including at masonry, to conform to dimensions indicated and to field confirmed dimensions.

D. Movement: Install all work with proper allowance for expansion and contraction from thermal changes.

E. Joints: Construct all joints with laps in direction of flow. At butt and locked joints, construct joints watertight.

F. Hemmed edges: Turn back metal to form hemmed edged wherever the edge creates a hazard or where it may cut into membranes. Provide hemmed edges at lower edges of flashing, counter flashing, coping covers, roof edge covers and the straight metal counter-flashing extending below plaza slabs.

G. Soldering: Screw, spot weld or rivet all soldered joints to take stress, with solder acting only as sealant between metal. Keep solder work neat, smooth, with no greater spread than required to seal the joint. For stainless steel solder work, carefully follow manufacturer's directions. Thoroughly clean all flux from surfaces and for acid type flux scrub residue, neutralize with ammonia or washing soda and rinse with clean water.

H. Keepers and wedges: Where shown, or required to firmly hold metal in place, provide continuous keepers, screeds or cleats of same metal as metalwork. Pro-



vide lead wedges where noted or where required to hold metal work firmly in place.

I. Shop corners: Provide shop built, soldered, inside and outside corners for coping covers, roof edge covers and similar work.

J. Built-in work: Furnish reglets or flashing receivers to mason for building in masonry. Furnish other metal to proper trades for installation when other work is in progress. Sheet metal fabricator is responsible to be aware of job progress and to provide built-in metal at proper time to prevent delays at job-site.

K. Existing construction: Where necessary at existing construction, cut out groove for receiving flashing or flashing inserts.

L. Plastic sheet: Except as specified under Sections 07110 or 07510, provide plastic sheet liner or protective flashing under metal as noted. Follow specifications for installation as included under applicable section.

### 3.2 LOCATION OF JOINTS IN METAL

A. Exposed work: At coping covers, roof edges and other metal exposed to view, provide joints so as to be symmetrical on facade and locate to center on other features as shown or approved, with 8 foot maximum length metal.

B. Counterflashing and concealed work: Joints may be placed where convenient to metal lengths, not over 10 foot lengths.

### 3.3 TYPES OF JOINTS

A. Coping covers, roof edge covers (built-in or entirely cover type), and similar exposed metal: Provide flush, butt type, with concealed back plate.

B. Curb Covering, expansion joints and membrane or control joints: Provide cover strip over joint with single lock seam between cover strip and each metal length (or use butt joints with back plate).

C. Counterflashing: Lapped joint.

D. Other joints: Similar to above outline for comparable joints. Where appearance is a factor (i.e.: Metal seen from ground or through windows) provide butt joints with concealed back plates.

### 3.4 END JOINT CONSTRUCTION

A. Butt joints with back plate:

1. Provide back plates of same gauge and metal as flashing metal, 5" wide (2½" each side of joint), conforming to exact shape of metal and full dimension of metal after forming.

2. At both ends of each length of flashing metal, provide bent clips spot welded near end, to receive back plate. Provide at least 3 clips at shapes such

as typical coping cover or roof edges. Construct so backplates slip under bent clips, forming tight contact with flashing or cover metal.

3. To install, butter a bed of concealed sealant on backplate and slide section of roof metal onto backplate, such that backplate fits into clips to hold metal tight and in perfect alignment. Coat entire contact surfaces between back of metal and face of backplates with sealant. Repeat until all metal has been set. At joints, allow about 3/8" clearance between edges of metal.

4. At locations with wood nailers, as at roof edges, at joint between lengths of metal, install screw with neoprene washers through backplate without fastening to metal flashing length, at top edge. (Notch out ends of flashing metal to accommodate screw heads and to eliminate obstructions for metal expansion). Also provide screw with neoprene washers at center of roof metal flashing, or provide keepers or cleats to keep metal in place. No screws at front faces, where face is exposed.

B. Locked Cover Strips: Provide cover strips with same profile as flashing and be formed with single lock seam to metal each side of joint. Provide about 3/4" seam lock, with flashing spaced about 3/8". Permit movement at each joint.

C. Lapped Joints: Lap 2" in direction of water flow. At counter flashings and similar work, lock bottom edges together.

D. General: At all corners, inside or outside type, provide sections built up in shop, with soldered joints. Corner units to be neat and follow profile of adjacent metal. No nails permitted at exposed surfaces of exposed roof metal, use only screws. Set roof edges in cooperation with roofer. At typical roof edges roofer shall install all roofing and flashing plies as specified under roofing. Form metal as indicated to field verified dimensions.

### 3.5 REGLETS AND METAL RECEIVERS

A. Conform to general details indicated. Form and construct reglets and receivers, including at plaza, so counterflashing may be easily inserted after composition flashing has been installed and so metal counter flashing can be easily removed in future by removing screws. See typical details.

### 3.6 CONTROL JOINT

A. General: Construct to details shown; with end joints to permit movement; watertight. Provide securely fastened and solder sealed joints at intersection with metal roof edges. Install after installation of composition plies of flashing to top of curb and continuous cover sheet of plastic flashing (set by roofer).

### 3.7 COUNTER AND CURB FLASHING

A. General: Install metal counterflashing after composition flashing and cap sheets are installed. Where inserts (reglets) occur, slip into receiver at bottom of insert and secure with stainless steel (or non-ferrous) screws about 18" o.c. Coordinate with other contractors. Lap joints and lock lower edges together. Counterflashing to provide watertight closure over top of composition

flashing. At corners, curbs and similar intersections, solder watertight. Carry counterflashing down 45° cant strip to about 1" above roofing membrane.

B. Combined curbs: Note that where curbs or ventilators are less than 20" apart, they shall be combined into a single unit so roofing will not be installed between them. Provide a sheet metal saddle between individual vents (at top of curb, form to drain, reinforce to support units and to prevent being deformed).

### 3.8 METAL WORK BUILT INTO MEMBRANES

A. Set metal built into membranes in cooperation with roofer. Install on full bed of plastic cement and after first plies of roofing are installed and turned back, apply mastic to roofing to receive metal. Install cleats about 24" o.c. at flange in roofing and keeper at bottom of exposed vertical face. Roofer to install flashing plies over metal, set in plastic cement.

### 3.9 SCUPPERS

A. Construct to sizes and to general details indicated. Provide scuppers for openings thru precast panels, built into flashing or not. Construct watertight and to resist temperature changes. Set in full bed of plastic cement, all sides. At back side of scuppers, form a flange for building into roofing and flashing, about 6" wide flange, riveted and soldered to form watertight connection to scupper.

### 3.10 ROOF DRAIN RINGS

A. At all roof drains in sloped roofs, provide a 12 gauge 1" high ring, with 4" flashing flange, for building in as a gravel stop.

### 3.11 MISCELLANEOUS FLASHING AND METAL WORK REQUIREMENTS

A. Provide all miscellaneous metal flashing and other metal work shown.

B. Provide only stainless steel for metal work which will be in contact with precast concrete or which will allow water to wash onto same.

C. Bellows (if any): Construct of copper, with anchor, to a vee shape with round apex. Form to divide wide joints into 2 equal spaces, and to flex with building movement.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all caulking, sealing, and gasket work except that specifically required under other sections.

C. Related work specified elsewhere:

1. Caulking and sealants related to membrane waterproofing: Section 07110.

2. Caulking and sealants related to roofing: Section 07510.

3. Caulking and sealants related to sheet metal flashing Section 07600.

1.2 GENERAL INFORMATION

A. Following outline is intended to indicate the locations and general types of work under this Section as well as to complement and clarify drawing requirements. Do not construe as indicating all work required by this Section, describing all operations or mentioning each type of sealing requirement. Refer to drawings and other Sections for additional requirements.

1. Vertical Surface Joint Sealant: This is the primary sealant for use at all exterior joints, walls and at all other caulked joints in vertical surfaces of the exterior of the building.

2. Interior vertical surface joint sealer (caulking): This is the primary interior sealant for all uses in joints in vertical surfaces except acoustical sealant.

3. Compression Seals: Provide compression seals at all surfaces of expansion joints.

1.3 SUBMITTALS

A. Color Samples: Submit actual samples of full color palette of each material for Architect's selection.

B. Manufacturer's Recommendation: Submit technical data including performance requirements, recommendations and application instructions to the Architect for approval of materials used.

## PART 2: PRODUCTS

### 2.1 SEALANTS

A. Primary Vertical Surface Joint Sealant: Sealant shall be a gun-grade class B, non-sag two-part polysulfide sealant licensed by Thiokol Chemical Corp. as conforming to Thiokol Building Trade Performance Specification, such as Tremco "Lasto-Meric", W.R. Grade Hornflex, Pecora Synthacalk GC-5, Sonneborn Sonolastic (two-part), or approved equal. Special sealant color may be required, to blend with precast and to be similar or match Health Sciences Unit A sealant, as selected by Architect. Provide in-place samples, after preliminary selection, for final approval.

B. Interior Vertical Surface Joint Sealant: Same as 2.1.A, above.

C. Primer: Provide primer type as supplied or as recommended by manufacturer of sealant or gasket material, including "conditioner" for exterior slab sealant.

### 2.3 COMPRESSION SEALS

A. Compression Seals: Compression seals shall be Acmasel S-745 as manufactured by Acme Highway Products Corporation or approved equal.

B. Compression Seal Adhesive: Acma lubricant adhesive recommended by the manufacturer for the specific application and installation method.

### 2.4 BACKING AND BOND BREAKERS

A. Backing and Rod Stock Backstops: Refer to other Sections (including Sections 03300, 04200) for backstop provided under other sections. Where appropriate backing for proper joint configuration is not supplied by others, or where backing is too deep in joint, provide "Ethafoam" rod stock (or other similar recommended rod type backing) oversize for joint. At all locations, provide approved backstop that will prevent sealant adhesion at backside and use as separator between non-compatible sealant materials.

B. Bond Breaker: Aluminum foil or other sheet goods, compatible with sealants.

## PART 3: EXECUTION

### 3.1 GENERAL INSTALLATION REQUIREMENTS

A. DILUTION: DO NOT DILUTE, CUT, GAS, ADULTERATE OR OTHERWISE CHANGE ANY SEALANT. SUCH PRACTICE WILL RESULT IN AUTOMATIC REJECTION OF CAULKING SUBCONTRACTOR. IN ADDITION, ALL CAULKING DONE WILL BE REJECTED, REMOVED AND REPLACED BY OTHERS AT EXPENSE OF OFFENDING SUBCONTRACTOR, TO EXTENT DIRECTED BY ARCHITECT OR UNIVERSITY.

B. Joint Condition: Do not work until joints are in proper condition for best results. Caulking subcontractor shall perform all work to insure joints that are clean, dry, and free from frost, dust, oil (including form oil) or other residue that will prevent or reduce adhesion. Joint defects, including lack of

adequate depth or size shall be corrected by prime contractor.

C. Primer: At porous surfaces and elsewhere recommended by sealant manufacturer, prime joints with clear primer made for that purpose, as recommended by manufacturer. Surface to show gloss. Primer is required at stone, porous masonry and porous concrete. Provide primer (conditioner) at all joints to receive exterior slab sealant.

D. Clean Sealant: Keep surface of all sealant clean until "skinning" has taken place. Do not caulk under conditions which will permit dust to adhere to surface.

E. Joint Design and Configurations: Details provide only general indications as to where sealants occur. Provide proper depth of material in relation to width, with proper configuration to insure proper adhesion, without exceeding adhesion abilities of the sealant. Obtain manufacturer's recommendations and keep copy at jobsite to permit reference. Joint size and configuration shall be as recommended by manufacturer for location, proportion, type of stress and shape, including joints in shear. In all cases, provide backstop or bond backer at backup to prevent sealant from adhering to backup.

F. Instructing Mechanics: Prior to commencing work, thoroughly instruct all mechanics in the proper methods and techniques required to insure best possible end result. In addition to reviewing instruction of each of the manufacturers involved, review requirements of temperature, surface of sealant with relation to surrounding materials, cleaning joints, priming joints, backstops and joint configurations.

### 3.2 CAULKING

A. General: Do not caulk during period of precipitation nor immediately thereafter. Provide proper backing at all joints. Provide rod stock typically at all joints, including raked back mortar, except where gaskets are provided. Use oversize rod stock to insure proper shape and to hold rod stock backing firmly in place. Follow manufacturer's recommendations on joint proportions. Caulking depth generally shall be two-thirds of joint width, but not less than  $\frac{1}{4}$ " depth. Fill joints over  $\frac{3}{8}$ " in width by at least 3 passes, running a bead in each corner and finish by a bead down center.

B. Preparation: Before caulking, take only measures to insure clean, dry joints. Brush, degrease, dry and clean all grooves. Use solvents recommended by manufacturer.

C. Temperatures: Caulk under ideal temperatures, above 40°. If necessary, provide heated enclosures to accomplish work under ideal temperatures.

D. Caulking: Use proper and approved guns, with proper size nozzles, including offset nozzles at limited clearance spaces. Mask adjacent surfaces as required to prevent surplus or misplaced sealant. If caulking operations indicate careless workmanship, misplaced sealant or sealant smeared (or overlapping) adjacent surfaces, masking will be required (and provided without extra cost) at all locations. Finish joints by neatly pointing with beading tool. Apply surface coating to surface of sealant before tooling only if recommended by manufacturer and if coating will not discolor caulking.

E. Cleanup: Immediately clean adjacent materials which have been soiled; leave work in a neat, clean condition; finish work to be smooth, clean, even surfaces, neat, free from holes, pits and absolutely watertight.

F. Rope Wicks: When wicks for weeping masonry or in-wall flashing occur, cut wick flush with caulking face and do not seal wick ends.

G. Recessed Caulking: Where shown, caulk so surface of caulking is uniformly back from adjacent surface. Where not otherwise indicated at recessed caulking, hold surface back about  $\frac{1}{4}$ ".

### 3.3 INSTALLING COMPRESSION SEALS

#### A. Joint Preparation and Seal Installation.

1. Where indicated and noted on drawings, install the proper seals in a neat, workmanlike manner. All surfaces to receive Acmasel shall be free from dirt, water, oil, rust, frost and any other loose foreign debris which may be detrimental to effective joint sealing.

2. All joints to receive Acmasel shall be free from defects such as spalls, cracks or loose materials.

3. For ease of installation, the air temperature should be below 85°F. At higher temperatures, the joint opening closes to such a degree that the seal becomes difficult to insert.

4. Apply a continuous coat of Acma Prima-Lube Adhesive to both joint interfaces immediately prior to seal installation. Prima-Lube Adhesive shall not be applied below 40°F.

5. Unless otherwise specified, Acmasel to be installed shall be recessed  $\frac{1}{8}$ " to  $\frac{3}{8}$ " depending on seal size and application.

6. All joints on drawings required to be sealed shall be the responsibility of the contractor to install the proper size seal for the constructed joint at the time of installation.

7. For turns and junctions, Acmasel shall be spliced using Aron Alpha Adhesive to provide a permanent, watertight joint. T-joints, X-joints and L-joints are made just as easily using a closed cell Neoprene sponge (Grade SC41-ASTM Spec. C-509) bonded to Acmasel at each intersection in accordance with manufacturer's recommendations.

#### B. Protection of Personnel.

1. Health: Warn all personnel against breathing in adhesive and solvent vapors and to avoid contact with skin and eyes. Application of adhesive and solvent should take place in a well ventilated area.

2. Fire: Keep all adhesives and solvents away from heat, sparks and open flame.

3. Observe all manufacturer's safety precautions as shown on can labels.

C. Final Clean-Up: Misapplied adhesive shall be immediately removed. Solvent such as methylethylketone (MEK) or toluene may be used.

### 3.4 WORKMANSHIP

A. Conform to best practice and accomplish by using mechanics skilled in their trade. Caulking shall accomplish its purpose to prevent admittance of air and water. Remove and replace defective caulking. Requirements herein specified are minimum requirements as to materials and methods and perform work and use all means as necessary to insure best results. Assume responsibility for defective work. Following types of failure will be adjudged defective work: Leakage of air or water; hardening, cracking, pulling away from adjacent surfaces; loss of bond; crumbling; sagging; shrinking; running of compound; staining of adjacent work by compound; improper levels; surfaces which are not smooth.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all hollow metal shown on drawings and specified herein which includes the following but not limited to: Exterior and interior hollow metal doors, and frames including UL labeled and nonlabeled openings. Provide standard and special anchors, clip angles, etc, required for installation. Miscellaneous metal frames are not included.

C. Related work specified elsewhere:

1. Grouting of frames: Sections 04200, 09100.
2. Metal Fabrications: Section 05500.
3. Carpentry: Section 06100.
4. Metal Siding: Section 07411.
5. Finish hardware: Section 08700.
6. Field painting: Section 09900.
7. Louvers: Section 10200.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop drawings of hollow metal items in accordance with Section 01300. Show all features of construction, dimensions, gauges, re-inforcements, cutouts anchorage to adjacent construction and other pertinent data.

1.3 PRODUCT HANDLING

A. Handle, transport and store hollow metal work in a manner that will prevent damage and deterioration. Provide proper packaging to protect all items. Store at the project site in an upright position under cover and on wood sills.

## PART 2: PRODUCTS

2.1 MATERIALS AND MANUFACTURERS

A. This specification is based on Trussbilt Stockline Hollow Metal Doors and Frames.

B. Comparable products manufactured by Overly Mfg Co., Pioneer, Steelcraft or Curries Manufacturing, Inc, or approved equal which conform to these specifications will be acceptable.

## 2.2 FABRICATION

A. Construct all work in a first class manner in accordance with details and approved shop drawings. All joints and mortises shall be to hairline accuracy, with all welds continuous and ground smooth and with all items square and true.

B. Factory assemble frames in the largest size units permitted by shipping restrictions for minimum assembly of related parts at the job site.

C. Frames:

1. Provide one piece welded unit type construction formed to the profiles shown on details. Construct frames of hot-rolled pickled and annealed steel. Use 16-gauge for all frames. Label frames, 16 gauge or heavier if required by label.

2. Miter all corners, including stops, to hairline accuracy continuously arc welded on the back side. Grind frame faces smooth for invisible joint. At mullion intersections of special frames, arc weld faces of frames and stops. Welding and grinding to flush, smooth surfaces shall be done to preserve the original profile of the frame and to maintain crisp square corners. Spot welding of reinforcement shall be invisible on exposed surfaces.

3. Provide at least three anchors at each jamb for anchoring frame to adjacent construction. Type of anchor shall be determined by the type of construction and as recommended by the frame manufacturer. Provide 2" x 3½" x 12-gauge floor clip angles. Where no separate structural lintel is indicated for frames in 4" walls, provide a 12-gauge channel head reinforcement, welded to frame head.

D. Doors:

1. Provide hollow metal doors of size and type shown. Construct of cold rolled, stretcher-leveled furniture steel. Use 16 gauge face sheets for exterior doors and 18 gauge face sheets for interior doors, or heavier as required by Underwriter's label. No seams on face sheets. Provide an 18 gauge steel channel on top and bottom of doors. Provide watertight flush plate at top to prevent water pockets. Door edges shall be flush and smooth, without visible seam or joint.

2. Provide continuous true truss inner core, full height and width, spot welded to face sheets 3" on center both vertically and horizontally

or

2. Provide an inner core consisting of vertical stiffeners of 16-gauge channel or zee members spaced 6" on center and spot welded to face sheet 3" on center.

3. Insulate doors and panels with 6-pound density mineral rock wool.

4. Provide glass light and louver openings as required complete with re-

movable molding hand fitted to each opening with joints true and tightly fitted. Fasten with #6 Jackson-head screws. Moldings shall not overlap door face sheets. Install door louvers at the factory.

5. Construct stile and rail doors with equivalent reinforcing to flush doors. Reinforce intersections of stiles and rails to form rigid unit, capable of severe abuse without racking or sagging. Weld intersections of stiles and cause no defects to be visible through paint. Provide MDO at face of all exposed plywood unless otherwise indicated.

E. Hardware Preparation:

1. Mortise, reinforce, drill and tap doors and frames for hardware using templates furnished by the hardware supplier. Provide the minimum reinforcements and components required by the Steel Door Institute Standards for template doors and frames.

2. Provide three Glynn-Johnson GJ64 moulded, non-staining rubber mutes for all interior door frames.

G. Underwriters Construction:

1. Provide Underwriter's construction and labels of the classifications required by the drawings. Label requirements shall take precedence over any conflicting portions of the drawings and specifications. Hollow metal shall be capable of the required label with the specified hardware, including single point locks.

2.3 PAINTING

A. After fabrication, thoroughly clean all items of rust, oil, grease or other impurities, spot glaze where necessary to correct defects and apply the following coats of red oxide primer, each coat baked-on.

1. Frames - 1 coat.
2. Doors - 2 coats.
3. Interior of exterior doors and label doors - 1 coat.

PART 3: ERECTION

3.1 ERECTION

A. Erect frames in position plumb, rigid and in true alignment. Provide the necessary bracing and spreaders to prevent displacement or distortion until adjacent construction is completed. Securely attach frames to floor and adjacent construction. Frames in masonry walls shall be grouted full of mortar at jambs and anchors built into joints by the mason as the walls are laid up.

B. Drill and tap for field splices and connections after erection. Caulk splices and connections and leave finished work smooth and free from warps and buckles.

## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing and installation of floor access doors.

C. Related work specified elsewhere:

1. Concrete: Section 03300.

1.2 QUALITY ASSURANCE

A. Units as manufactured by Bilco Products, Inc., are specified to establish a standard of quality. Equivalent units manufactured by Babcock-Davis Associates, Inc., or approved equal will be acceptable subject to meeting the performance and construction criteria of the base product.

1.3 SUBMITTALS

A. Shop Drawings: Submit fabrication and installation drawings in accordance with Section 01300.

1.4 DELIVERY, STORAGE AND HANDLING

A. Package, deliver, handle and store at jobsite to avoid damage. Repair or replace damaged material.

1.5 JOB CONDITIONS

A. Coordinate installation with Roofer.

## PART 2: PRODUCTS

2.1 FLOOR ACCESS DOORS

A. Bilco, Model No. KD, double leaf aluminum type, custom sizes as indicated on drawings.

## PART 3: EXECUTION

3.1 INSTALLATION

A. Installation shall be made by manufacturer or authorized installer.

## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing of all finish hardware shown on drawings and specified herein except for that specified under other sections.

C. Related work specified elsewhere:

1. Hollow Metal: Section 08110.
2. Other finishing hardware specifically included with manufactured items or under specific fabrication or erection specifications: Applicable sections.
3. Rough hardware: Applicable sections.

D. Furnished but not installed under this section:

1. Finish hardware is installed under Section 06100.

E. Outline and schedules contained herein have been listed to indicate scope of work. Under this Section provide all work reasonably required by the general scope as outlined herein, and all work shown on drawings. Provide items, articles, materials, operations and methods listed, mentioned or scheduled herein or on drawings, in quantities as required to complete the project. Provide hardware which functions properly and advise Architect of any items that will not operate properly and are improper for conditions or will not remain permanently anchored before hardware is furnished.

1.2 SUBMITTALS

A. Schedule: Submit in accordance with Section 01300 and the following:

1. Numbers in this schedule are taken from catalogs of P&F, Corbin, Lawrence, LCN, VonDuprin, Hiawatha, Best, Ives, and Glynn-Johnson. Submit three copies of hardware schedule to Architect.

2. Resubmit six corrected copies.

3. Submit a brochure of all approved items to facilitate Architect's checking of catalog items.

B. Templates: Submit necessary templates and schedules as soon as possible to hollow metal, wood door, and aluminum entrance fabricators in accordance with the schedule they require for fabrication.

### 1.3 DELIVERY, STORAGE, HANDLING

A. Properly and carefully pack items to guard against damage in transit. Pack each group separately and mark clearly to show its contents and place in building for which it is intended. Do not deliver hardware until General Contractor has suitable locked storage space.

### 1.4 GUARANTEE AND ADJUSTMENTS

A. The hardware distributor shall guarantee all workmanship and material against defective manufacture, and he shall replace and made good all defective workmanship and material appearing within a period of one year. Hardware distributor shall not be responsible for faulty application.

B. Where hardware indicates improper operation, hardware supplier or manufacturer shall visit job and make necessary adjustments and corrections. Where hardware is inadequate for required function, exposure or use, replace with suitable hardware as directed.

C. Shortages and/or incorrect items (based on the plans and specifications and approved samples lists and schedules) shall be furnished and/or replaced with correct material by the hardware distributor, at no additional cost to the Owner.

D. At completion of project, General Contractor shall notify hardware subcontractor, who shall have a qualified factory representative make inspection of closer installations. Final adjustments of closers shall be made by representative and a letter sent to Architect reporting conditions and that final adjustments have been made.

## PART 2: PRODUCTS

### 2.1 GENERAL QUALITY

A. Furnish new hardware, free from defects, scratches, mars, etc. Furnish hardware complete with necessary screws, shields, grommets, etc., for correct installation onto door, frame or other supporting surface for which each item is intended.

B. Unless specifically called for herein, furnish no hardware with aluminum components.

### 2.2 FINISH AND MATERIALS

A. Butts:

1. Butts for Interior Hollow Metal Doors: Dull chrome on steel, US26d.
2. Butts for Exterior Doors: Satem Stainless Steel, US32d.
3. Closers for Hollow Metal Doors: Prime coat of paint sprayed on cast iron or steel.

- C. Kick Plates for Hollow Metal Doors: US32d, stainless steel.
- D. Thresholds and weatherstripping: Aluminum.
- E. Balance of Hardware: US26d dull chrome on brass metal, unless noted.

### 2.3 LOCKS AND KEYING

- A. Provide locks and latchsets of "heavy duty" mortise locks, equal to Corbin 7500 series, with knobs and escutcheons scheduled, fully reversible, with adjustable armored fronts and anti-friction latch bolts with minimum 5/8" throw. Equivalent locks by Russwin or Sargent will be acceptable. Furnish strikes with lips sufficient length to protect trim and elsewhere as required.
- B. Provide Best Universal Lock Company's 7-pin cylinder with Best's interchangeable cores, typically #1E74, US26d.
- C. Unless otherwise specified, provide cast ball knobs 2-3/16" + diameter, with concealed screw attachments. Escutcheons to be 8 1/2" x 1-5/16" + x cast through bolted top and bottom (concealed) outside. All similar to Corbin 664 trim. Trim on doors in mechanical spaces to be similar to Corbin 700 x PK knobs.
- D. Master keying will be determined by Owner in conjunction with representative of Best Universal Lock Company. Keying to be three levels, master, sub-master and individual keys. Ship permanent cores directly to University of Minnesota, for installation by Owner. If Contractor desires temporary construction cores for certain locksets during construction, Owner will upon application, furnish and install reasonable number of such cores without charge.

### 2.4 BUTTS

- A. Type:
 

- Exterior doors	BB9151XNRP-32d	4 1/2 x 4 1/2
- Interior hollow metal doors	BB9101	4 1/2 x 4 1/2
- B. Size: - As above for 1-3/4" doors.
- C. Number:
  - Two pair for doors 3'-4" or more in width or 7'-6" or more in height and for exterior and vestibule doors and for all dutch doors.
  - 1 1/2 pair for all other doors.
- D. Ball Bearing Butts: Flush barrel with concealed ball bearings and bushings for lateral load.
- E. Tips: Flush tops, all butts.
- F. Manufacturer: All butts by one manufacturer, Lawrence BB 9100, Stanley BB600 Series, or McKinney TB2714 Series.

## 2.5 CLOSERS

A. For closers on exterior doors provide Size 6. For any bracket mounted closer, provide not less than size recommended by manufacturer for parallel arm installation. At any pair of doors provide same closer installation and size, with size equal to largest closer required.

B. Back Check: Provide back check for all closers.

C. Opening: Do not restrict door opening. Provide closers which permit full 180° swing wherever possible by jamb/wall conditions. In all cases closers shall permit swing over 90°.

D. Typical Closers:

1. Exterior Doors: 4110-CUSH.

2. Typical Interior Doors:

a. 2'-8" or less in width any degree opening or 3'-0" or less in width 90° opening: 4030 Series.

3. Acceptable Closers:

<u>LCN</u>	<u>Norton</u>
4020	J7730
4030	7400
4010	7700

E. Furnish closers for all doors as noted in groups and in addition, furnish closers for all labeled and/or labeled construction doors whether or not specifically noted in group.

## 2.6 KICK PLATES AND ARMOR PLATES

A. Kick Plates: 14" high generally, .050 thickness with countersunk screw holes. Width shall be 1½" less than door width on stop side of doors and ½" less than door width on hinge side of doors. Where one kick plate is specified, install on stop side of door. Packaging, workmanship and quality equal to Hiawatha hardware.

B. Furnish kick plates for all doors with closers and in addition for doors in hardware groups with kick plates specified.

## 2.7 STOPS AND HOLDERS

A. Provide a stop or holder for all doors, whether noted in schedule or not. Provide door holders for doors where listed in hardware groups. Provide a stop type WB50X or GJ500A series, as required for all doors not equipped with holders or other specified stop. Furnish WB50X wherever possible. Furnish GJ500A series for all doors shown not to swing against walls and for all hardware groups prefixed "OH". Stops by Ives, Glynn Johnson, Baldwin or Quality. Secure



stop or holder with toggle bolt at all steel stud partition locations. Furnish holders W20X or W20AX for all doors with hardware groups prefixed "H". Furnish holders GJ120 for all doors with hardware groups prefixed "OHH".

## 2.8 PAIRS OF DOORS

A. Unless otherwise specified, furnish two bolts Corbin 2846 - or equal, Ives, Russwin, or Sargent for all pairs of non-labeled doors with locks or latch sets. Furnish dustproof strike plates for bottom bolt. Unless otherwise specified, trim each leaf of a pair of doors identically. Bottom bolt 12" size, top bolt size required to mount approximately 6' up from floor. For hollow metal pairs of labeled doors, provide VonDuprin self-latching flush bolt 037 and coordinator 2369.

### PART 3: HARDWARE SCHEDULE

#### Group 1

All pairs exterior doors:

- Active Leaf:
- 1 Lockset 7551
- 1 Closer
- 1 Kickplate
- 1 Sill Sweep Reese 362 A
- 1 Astragal Reese 187
- Inactive Leaf:
- 2 Flush Bolts
- 1 Dust proof Strike
- 1 Sill Sweep Reese #362A
- Opening
- 1 Set head & jamb weatherstrip Reese DS78
- 1 Threshold Reese PG691

#### Group 2

Pairs interior label doors:

- Active Leaf:
- 1 Lockset 7551
- 1 Closer
- 1 Kickplate
- Inactive Leaf:
- 1 Set self latching flush bolts
- 1 Door Coordinator

#### Group 3

Single interior label doors:

- 1 Lockset 7551
- 1 Closer
- 1 Kickplate

- - -

## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this Section includes field finishing of all materials scheduled and/or specified for paint, enamel, and similar field painting not specified under other sections.

C. Related work specified elsewhere:

1. Metal Fabrications: Section 05500.
2. Carpentry: Section 06100.
3. Sheet Metal Work: Section 07600.
4. Hollow Metal: Section 08110.

D. General Outline of Work: Following outline is intended to complement and clarify the drawings. Do not construe as listing all surfaces, materials or finishes.

1. Exterior:

a. Hollow metal exterior doors and frames. Miscellaneous metal frames, sills, etc.

b. Exposed sheet metal, including: copings, counter flashing, roof vents, fan units, curb flashing, and similar sheet metal; see 07900 for prime coats.

c. Prime coated hardware.

d. Steel louvers.

e. All other exposed metal (unless excluded) of this Project, including exposed parts of new lintel plates and structural steel.

2. Interior:

a. Metal stairs, railings, handrails, including undersides, brackets and other parts.

b. Hollow metal, including doors, frames and other hollow metal. Paint on all sides including at rooms or spaces not otherwise painted or finished.

c. Steel covers and access panels.

d. Steel louvers.

e. Steel lintel plates.

f. Steel door sills.

E. Work excluded from this section (areas or materials):

1. Exterior:

- a. Face brick, stone.
- b. Factory finished surfaces. Prime coat does not constitute factory finish.

2. Interior:

- a. The walls and ceilings of any room or space.

1.2 INTENT OF DOCUMENTS

A. The Subcontractor providing the work of this Section shall examine the specifications for the various other trades and other contractors and shall familiarize himself with all their provisions regarding their painting and it shall be clearly understood that all surfaces scheduled or shown or specified herein shall be field painted or finished as a part of this Section.

B. Painting under this Section includes and means all specified or required preparatory work and application of paint systems including primers, paints, enamels and other similar finishes not specified under other Sections.

C. Except for factory finish coats and prime or finish coats on certain identified mechanical and electrical work, no painting is required of Mechanical and Electrical Subcontractors; field painting of all such surfaces, if required, shall be done by Painting Subcontractor under this section.

D. The number of coats specified are field painted coats, in addition to prime or shop coats, after all touch up work has been done to restore shop coats to full coverage. Use only first line products of manufacturers specified, of types of paint specified.

1.3 SUBMITTALS

A. Painting Systems: Submit for Architect's approval descriptive data in duplicate for paint materials and systems to be furnished. In this submittal, indicate each specified system, locations of use and the substitute system proposed.

B. Colors: The Architect will select all colors. If color selections are made which are not in the color line of the paint to be furnished, submit in duplicate for approval, 8" x 10" color cards showing the selected color in the paint to be furnished.

1.4 JOB CONDITIONS

A. Paint under conditions best suited for first quality work, including dry surfaces, dust free spaces, minimum temperature of 40° or higher as recommended by manufacturer. Paint exterior surfaces only when not subject to damage from present or subsequent rain, frost or other inclement weather, or when base sur-

face is thoroughly dry. Work with adequate illumination. Avoid painting of surfaces while they are exposed to hot sun.

B. Protection:

1. Protect all surfaces subject to damage and misplaced paint by covering with drop cloths, by masking, by other suitable covering or by removing from area.

2. Make good any damage caused by painting operations.

3. General Contractor shall isolate, cover or protect as necessary to insure no damage, stains, abrasions, other disfigurement of finish painted surfaces immediately upon completion by painter of final application to such surfaces.

4. Maintain 10# CO extinguisher in paint storage, mixing rooms. Remove oily rags and other fire hazards at end of day's work. Keep cans tightly covered. Take every precaution to avoid danger of fire.

C. Cleanup:

1. Remove oily rags, waste, etc. from building every night.

2. Upon completion of work, remove all misplaced paint, stains, etc. and remove all debris, rubbish, materials and equipment, and excess materials from the premises.

1.5 PRODUCT HANDLING

A. Delivery: Deliver all materials in the original containers, with seals unbroken and labels intact.

B. Storage:

1. Store and mix materials in designated places only. Protect walls and floors of storage rooms.

2. Post storage and mixing areas "NO SMOKING" and strictly enforce.

1.6 GUARANTEE

A. Guarantee all work for one year against blistering, peeling, or other loss of adhesion, yellowing, excessive chalking, other defects in material or workmanship. Remove defective work, prepare and repaint surface without cost to University. PART 2: PRODUCTS

2.1 MATERIALS

A. Use only materials of brand and quality specified, if brand and quality are not specified, use material approved by Architect and Owner.

- B. Provide paint manufactured with lead-free pigments and colors. Verify with manufacturer.
- C. Provide turpentine, alcohol, mineral spirits, bonding solution, sundries, etc., of highest quality, pure and with identifying label on container and in accordance with paint manufacturer's recommendations.
- D. Use no material over paint product of another manufacturer except as otherwise specified or permitted by Architect, and only if recommended by manufacturers.
- E. Before applying paint over any shop coat or other pre-primed surfaces, verify compatibility of coatings.

## 2.2 COLORS

A. General: Architect will select colors, which may be from University of Minnesota Standard Color Palette. Mix paint to match color chips where necessary. Prepare actual samples, including natural finish as directed.

## 2.3 PAINTING SYSTEMS

A. Painting systems are specified using the products of Pratt and Lambert Company to establish standards of quality. Comparable systems of O'Brien Paint Company, Benjamin Moore & Company, Sherwin Williams, Martin Senour Company, Pittsburgh Plate Glass, The Glidden Company and Devoe & Reynolds, or approved equal, will be acceptable subject to approval by the Architect of the systems and specific products.

B. Use the materials of the same manufacturer for each system insofar as possible.

C. Exterior and Interior Systems:

1. Ferrous Metal:

- 1 - Coat P&L Effecto Enamel Primer. (Spot prime if existing)
- 2 - Coats P&L Effecto Enamel.

2. Galvanized Metal:

Touch up with zinc-rich primer, thm2 coats P&L Effecto Enamel.

D. Interior Systems:

## PART 3: EXECUTION

### 3.1 EXAMINATION OF SURFACES

A. The Subcontractor shall examine the surfaces to be finished prior to commencing work. If any surfaces to be finished cannot be put in proper condition for finishing by customary cleaning, sanding and puttying operations, notify the Contractor in writing or assume the responsibility for and rectify any

unsatisfactory finish resulting. Test surfaces for dry condition to receive paint.

### 3.2 WORKMANSHIP

A. Job Site Sample Areas: Make sample application on Project surfaces to extent directed by Architect or Owner. Obtain acceptance of sample field application before making additional applications. Accomplish all work to equal or exceed standards established by approved samples. Protect and maintain approved field samples through completion of Project.

B. The workmanship shall be of the very best, employing only skilled mechanics. Spread the materials on in even, thorough coats without runs, sags or other blemishes. Meet standards and recommendations for "Type 1 - Recommended" type work of Painting and Decorating Contractors of America, as minimum requirements, in absence of more stringent Project specification requirements.

C. Consult with Architect and/or manufacturer's technical representative if in doubt as to suitability of material to application. Verify that paint is compatible with shop coat of others.

D. Apply succeeding coats only after prior coat has been approved by Owner, otherwise no credit will be given for the coat.

E. Coordinate work with others to insure that work to be painted is given maximum possible protection by applying coatings at times as will best insure such work against deterioration of any kind. Apply back prime and prime coats to millwork as soon as practicable after delivery to job.

### 3.3 SURFACE PREPARATION

A. All surfaces to be painted shall be cleaned and free of dirt, grease, rust, and dust before painting is started. Knots, streaks and sappy spots shall be touched up with an approved primer or sealer after removing pitch.

B. Touch up metal where shop coats are abraded. Clean down to bare metal and touch up paint used for shop coat.

C. All metal surfaces shall first be washed with mineral spirits to remove any dirt or grease before applying materials. Where rust or scale is present, it shall be wire brushed or sandpapered clean before painting.

D. Remove and reset hardware as required to completely finish surfaces and prevent misplaced paint. Cooperate with other trades and schedule painting operations prior to final setting and adjustment of hardware.

E. All coats shall be thoroughly dry before applying succeeding coats.

### 3.4 APPLICATION

A. Apply all materials without reduction, unless reduction is explicitly required by manufacturer's original container label or unless otherwise directed

or approved by Architect. Adulterate no material.

- B. Apply all coatings smoothly, evenly and free of runs, sags, crawling, impurities and skins.
- C. Apply over only thoroughly dry preceeding coat. Follow manufacturer's printed directions for drying time of undercoats. (Generally 24-hour minimum will be required.)
- D. Color each paint coat to approximate color, somewhat lighter, of succeeding coat.
- E. Paint primed hardware, including closers, carefully, neatly and so no hardware paint shows on doors or frames. Keep other finished hardware completey free of paint.
- F. Apply paint adjoining other materials or other colors with full, clean cut lines without overlapping and to straight line.
- G. Apply all work so free of runs, holidays, dead spots, roller or brush marks, foreign materials and impurities, etc., and uniform in color and sheen. Apply additional coats at no expense to Owner to areas showing such deficiencies or thin spots or other lack of hiding.
- H. At completion of work of other trades, touch up and restore all painted work where damaged or defaced, free of blemishes.
- I. Apply coding to piping as directed and specified.
- J. Discard all containers as they are emptied. Reuse will be prohibited.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1, General Requirements, apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010, Summary of Work and Special Requirements, for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods, and other conditions.

B. Work under this section includes all wall louvers.

C. Related work specified elsewhere:

1. Field painting: Section 09900.

1.2 QUALITY ASSURANCE

A. Products of the Airolite Co. are specified to establish standards of quality and performance. Products of Construction Specialties; Ventilouvre Co., Inc.; Louvers and Dampers Inc.; Industrial Louvers, Inc.; American Warming and Ventilating Inc.; or approved equal which meet the following specifications, are acceptable.

1.3 SUBMITTALS

A. Shop Drawings: Submit fabrication and installation drawings in accord with Section 01300.

B. Performance Data: Submit certified data from an independent testing laboratory substantiating aerodynamic performance of all louvers and, in addition, acoustical performance of acoustical louvers.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver in sections as large as practicable for handling and installation.

B. Protect as required during handling to preclude damage. Replace any damaged units or parts.

## PART 2: PRODUCTS

2.1 EXTERIOR LOUVERS - STEEL

A. Airolite Co., 4" thick, 16-gauge galvanized, bonderized steel, weatherproof profile type, model 638-C-100. Provide with vertical invisible mullions, flashing, sills, as required.

B. Bird screen shall be ½" square mesh, 14-gauge galvanized, bonderized steel, in standard frame, inside mounted.



C. Entire unit prime painted.

## 2.2 STEEL REINFORCING MEMBERS

A. Rolled steel shapes. Steel conforming to ASTM A-36, sized as detailed or required for installation.

## 2.3 FLASHING MATERIAL

A. 20-gauge, galvanized, bonderized, steel sheet for steel louvers, shop primed to match louver primer.

## PART 3: EXECUTION

### 3.1 INSTALLATION

A. Erect in accordance with approved installation drawings.

B. Install flashings in conjunction with louvers. Coordinate with other trades and Mechanical Contractor for connections.

C. Install all supporting members as indicated.

D. Provide dissimilar metal protection where required.

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MECHANICAL SPECIFICATIONS

JACKSON OWRE MILLARD LYON COMPLEX REMODELING  
CONTRACT A (JOML-A)  
MINNEAPOLIS CAMPUS  
UNIVERSITY OF MINNESOTA  
COMMISSION NUMBER 280.01  
PROJECT NUMBER MINN. BRHD-HP-5C-070

James F. Brinkerhoff  
Vice President for Finance and Development      University of Minnesota

Clinton N. Hewitt  
Assistant Vice President for Physical Planning      University of Minnesota

THE ARCHITECTS COLLABORATIVE, INC.      Cambridge, Massachusetts

HEALTH SCIENCES ARCHITECTS & ENGINEERS, INC.  
University Park Plaza - Suite 704  
2829 University Avenue South East      Minneapolis, Minnesota  
(612) 378-3833      55414

The Cerny Associates, Inc.      Minneapolis, Minnesota  
Hammel Green and Abrahamson, Inc.      Saint Paul, Minnesota  
Setter, Leach and Lindstrom, Inc.      Minneapolis, Minnesota

I hereby certify that these plans, specifications or reports were prepared by me or under my direct supervision, and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.



Date: July 20, 1976

Reg. No. 8185

## PART I: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this Division. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. These conditions supplement provisions of General Conditions and Division 1.

1.2 SHOP DRAWINGS AND EQUIPMENT BROCHURES

A. Refer to and comply with Section 01300.

1.3 DRAWINGS

A. In general, the drawings of the mechanical systems and equipment are to scale. However, to determine exact locations of walls and partitions, the Contractor should consult the architectural and/or structural drawings. Drawings shall not take precedence over field measurements.

B. Plans of piping although shown on scale drawings are diagrammatic only.

They are intended to indicate size and/or capacity where stipulated, approximate location and/or direction, and approximate general arrangement of one phase of work to another, but not the exact detail or exact arrangement of construction. If it is found, before installation of any or all construction phases, that a more convenient, suitable or workable arrangement of any or all phases of the project would result by varying or altering the arrangement indicated on the drawings, the Architect/Engineer may require the Contractor to change the location or arrangement of his work without additional cost to the Owner, in accordance with directions from the Architect/Engineer.

C. Where discrepancies are discovered after certain portions or phases of any contract have been installed, the Architect/Engineer reserves the right to require the Contractor to make minor changes in pipe, duct, fixture, or equipment locations or arrangements to avoid conflicts with other work at no additional cost to the Owner.

D. Because the drawings are to a relatively small scale to show as large a portion as is practical, the fact that only certain features of the system are indicated does not mean that other similar or different features or details will not be required. Contractor shall furnish all incidental labor, material or equipment for the systems in their control so that each system is a complete and operating one unless otherwise specifically stipulated in the detailed body of the specifications.

E. In general, pipe lines requiring drainage shall be laid out at the site first, then large pipe mains, then space for air ducts, then electrical conduit. Space has been allowed in the layout of piping and equipment in the equipment towers for the future installation of additional piping, ductwork, equipment

etc. The installation of piping and equipment shown should comply exactly with the drawings to reserve space for the future equipment. Where conflicts occur the Architect/Engineer should be contacted to coordinate any changes.

#### 1.4 CONNECTIONS AND LAYOUT

A. It shall be the responsibility of this Contractor to make connections at terminal points of contract. The piping and equipment, etc., may be shown with excess clearances for clarity. However, the Contractor shall group pipe and arrange all equipment to present a neat and workmanlike appearance and to avoid blocking of passageways.

B. Contractor shall apply for and include in his bid all fees, city inspection charges, permit charges, (except permits paid by University - see Section 01010) work charges, etc., when required at time of Owner's signing of the contract.

#### 1.5 SERVICE INTERRUPTION

A. This Contractor shall schedule his work in such a manner that he does not interrupt any services to any University of Minnesota buildings unless authorized by the University. Refer to and comply with requirements of General Conditions, and Division 1.

B. Any service interruptions to a building, or portion of a building shall be cleared and scheduled with the University prior to the interruption.

#### 1.6 MAINTENANCE AND OPERATING INSTRUCTIONS

A. Refer to and comply with Section 01700 requirements. The Contractor shall prepare a portfolio, as soon as possible after equipment has been ordered, of all mechanical equipment furnished by him on the project. This portfolio shall include manufacturer's shop drawings, parts' lists and operating and maintenance instruction of such equipment. Information shall be submitted in triplicate, neatly folded to approximately 8-1/2" x 11" size and bound in indexed loose-leaf binders of adequate size to contain the material. Each binder shall be properly identified. Upon completion of these portfolios, the Contractor shall turn them over to the Architect/Engineer for approval and delivery to the Owner, before final acceptance of the project.

B. Instructions shall contain the following information and services:

1. Manufacturer's recommended cleaning and maintenance procedures.
2. List of materials recommended for maintenance.
3. Complete operating instructions.
4. Name and address of authorized service organizations and parts depot.

5. Where indicated in the specifications, the Contractor shall provide the services of a factory trained representative to instruct the Owner's authorized personnel in the operation, control and maintenance of equipment.

6. Refer to Sections of specifications for additional information to be furnished by the Contractor.

7. The Mechanical Contractor shall instruct the Owner's representative in the use of all equipment and systems, as specified in Section 01700.

#### 1.7 OTHER WORK

A. Other work will be performed by separate trades. This Contractor shall give careful consideration to work of all of the general, electrical, and other trades, and all subsidiary trades, and shall organize his work so that it will not interfere with the work of other trades. He must consult all the specifications for correlating information and all drawings for details, dimensions, foundations, pits, etc.

#### 1.8 CLEANING

A. Refer to and comply with requirements of General Conditions, Section 01010 and 01700. The Contractor and Subcontractors for the various phases of the work of this Division shall promptly clear away all debris, surplus materials, etc., resulting from their work or operations, leaving the job and equipment furnished under any or all contracts in a clean first-class condition.

B. The surface of all floor drains, clean-outs and other equipment shall be cleaned and each item shall be left in a first-class condition.

#### 1.9 DEMOLITION, REMODELING, CUTTING AND PATCHING

A. Refer to and comply with requirements of Section 01910.

B. The relocation of existing equipment and piping systems shall be accomplished in the least possible time. Work shall be scheduled so as to minimize the down time for the respective systems involved, and the schedule approved by the University in advance. This will be required for existing services being revamped and/or relocated and all interconnecting portions of these systems shall be installed as complete as practicable prior to actual shut-down for final connections.

C. As applicable, work shall be coordinated with the other contractors, other trades and with the University. In areas where work involved may interfere with existing building operations or require temporary or permanent cessation or relocation of building functions, the University must be consulted so that work schedules can be set up acceptable to all concerned.

D. This Contractor shall furnish and install all materials and equipment to complete remodeled areas of the existing buildings as shown on the plans specified herein, or required to complete the work indicated under this Contract, including all minor items necessary for complete and operating installation. This Contractor shall offset existing piping and ductwork as indicated on the drawings or as required to accomplish the remodeling indicated.

Refer to the architectural drawings for remodeling required.

E. This Contractor shall be responsible for all necessary cutting and patching required in connection with his work and where necessary because of removal or change of existing work. Cutting of structural members and finished surfaces shall not be allowed without permission from the Architect or Structural Engineer. These cutting and patching requirements will be modified only if general construction specifications and drawings specifically and clearly state that certain or all portions of same required for each of the various trades is to be performed by the General Contractor.

F. This Contractor shall remove existing mechanical work as shown, or is required to accomplish the work as indicated on the drawings. Where required, existing piping, ductwork and other mechanical work and systems shall be relocated or rerouted to accomplish and complete the work.

G. Cutting and patching to expose and remodel existing mechanical systems shall not be construed as the work of another contract unless specifically called for on another contractor's documents. In general, all patching caused by Mechanical Contractor's cutting and demolition work to accomplish the work of the Mechanical Contractor shall be done by the Mechanical Contractor, except as indicated to be done by the General Contractor on the Architectural Drawings.

H. Cutting required for plumbing, heating, ventilating and air conditioning work, etc., shall be done by the Mechanical Contractor to the entire satisfaction of the University and Architect/Engineer. Cutting shall be kept to a minimum which will allow the proper placement of the materials.

I. All unsalvagable materials shall be removed in a manner that will avoid damage to materials or equipment to remain and shall be completely removed and legally disposed away from the site.

J. Salvagable materials designated for re-use or relocation shall be carefully removed and shall be protected from damage until they are incorporated into the new work.

K. Salvagable mechanical equipment not specifically stated or specified to be reused should be reviewed with the University's representative as to disposition. If the University desires to retain, the equipment should be carefully removed, protected from damage and turned over to the University at a location outside the building. If the University does not desire the equipment, it should be completely removed and legally disposed away from the site.

L. See Sections 01010 and 01500 for special requirements such as the use of construction tools, barricades, and protection of the existing building.

M. The Mechanical Contractor shall repaint all areas where he has performed cutting and patching at rooms, spaces or locations that are not repainted under the General Contract, generally these will be locations where no demolition, cutting and patching is performed by the General Contractor.

N. Refer to Sections 01910, 04200, 09100 and 09900 for execution and requirements for patching and painting and comply with applicable provisions as to materials and workmanship.

#### 1.10 EXCAVATING

A. This Contractor shall do all trenching, excavating and backfilling required for his work. Any street, sidewalks, curb or paved area repairs necessary because of this work shall be his responsibility. Refer to General Conditions, Section 02200 for requirements of trenching, excavating, backfill and compaction; comply with applicable provisions.

#### 1.11 GOVERNING CODES

A. The mechanical installation shall conform to the current provisions of all local and State codes pertaining to plumbing, heating, ventilation and refrigeration work including, but not necessarily limited to the following:

1. Minnesota Building Code
2. Minnesota State Plumbing Code
3. American Water Works Association
4. National Electric Code
5. Minnesota State Board of Health
6. Minnesota Safety Code and Regulations
7. Sheet metal and Air Conditioning Contractors National Association
8. Local applicable ordinances

#### 1.12 STANDARDS

A. All materials supplied under the mechanical contract requirements shall conform to the latest editions of the following standards:

1. All applicable standards as published by the American Society of Testing Materials.
2. All applicable standards as published by the National Fire Protection Association.
3. American Standards Association
4. American Society of Mechanical Engineers
5. American Society of Heating, Refrigeration and Air Conditioning Engineers.
6. Air Moving and Conditioning Association

### 1.13 TESTS

A. All work shall be inspected, tested and approved as required by the State of Minnesota and local regulations. Tests shall be made in presence of proper Inspectors and Architect/Engineer or their duly authorized representatives. All tests shall be made by the Contractor at his own expense, unless specifically noted otherwise, and he shall furnish three (3) test certificates each to the University and Architect/ Engineer.

B. All work shall prove absolutely tight under required tests. All types of piping systems, except final tests of completed systems shall be made before pipe is covered or connected to fixtures and equipment. Tests required shall not be less than specified in the following paragraphs.

C. All gauges, tools, pumps, gas, air or other equipment required for testing and initial adjusting of piping systems shall be purchased and provided by this contractor.

#### D. Systems Tests

1. All soil, waste, storm water and vent conductors, etc., shall be tested with air of 5 psi pressure and shall remain constant for 15 minutes without the addition of air.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. This section specifies the basic materials and workmanship for the various mechanical trades. Its provisions apply to all work of the Mechanical Contractor.

## PART 2: INSTALLATION

2.1 GENERAL

A. All pipes shall be of the required size, round and straight and shall be cut, reamed, threaded, beveled for welding and/or otherwise prepared for joining with proper tools. All piping shall be properly enclosed, supported, guided, anchored, sway braced, connected, tested, cleaned and flushed out, properly insulated and protected where required, and run in a neat and orderly manner to the satisfaction of the Architect/Engineer. Lines required to be enclosed in ceilings, chaseways or similar spaces shall be installed to permit such enclosure as intended. This Contractor must lay out his work, properly locate the apparatus and add necessary pipe, sleeve, etc., and take his own measurements at building.

B. All pipes shall be run with proper grade to provide for easy draining and in group runs where applicable. Pipe sizes shown on the drawings are nominal pipe sizes and not outside diameters. Pipes shall be run substantially as indicated on the drawings; however, Architect/Engineer reserve the right to require this contractor to make minor changes in pipe locations where conflicts occur with other trades. Such changes shall be made without extra cost to the Owner.

2.2 PLUMBING PIPING SYSTEM

A. The continuous waste and vent piping method shall be followed for entire plumbing system.

B. All waste and vent piping shall be properly pitched 1/4" to the foot where possible and 1/8" minimum unless indicated otherwise so that all waste piping will drain back to main stacks and vent pipe will drain back to fixture unless loop venting indicates other pitch. Piping shall be properly supported so that it will not sag and form pockets. Joints between cast iron pipe and fittings shall be made using preformed molded rubber rings installed as per the manufacturers recommendations.

C. Plug or cap piping immediately after installation. Waste stuffed in open ends of piping shall be removed before installation of next length of pipe.

## 2.3 RAINWATER DRAINAGE PIPING SYSTEM

A. All rainwater drainage piping shall be threaded pipe and fittings pitched 1/4" to the foot. Piping shall be installed as high as possible to retain maximum space for the installation of future equipment. Piping shall be properly supported so that it will not sag and form pockets.

## 2.4 EARTHWORK

A. This Contractor shall furnish all equipment, materials, skills and services required for excavation, backfill and compaction required to perform the work under this contract. Contractor shall refer to Section 02200, Earthwork for general information.

B. All trench work shall be dug, ripped, blasted or jack-hammered to the alignment and depth shown and in segments of minimum length to minimize the time of open trench. Trenches in soil shall be adequately braced and sheeted so as to provide safe and efficient working conditions. All trenches shall be kept free of water at all times. The trench width may vary with regard to required depth and the nature of the undersoil conditions. The finish trench shall be sufficient dimensions to allow the pipe to be laid and joined in the manner intended.

C. All pipes in soil shall be laid on a 6" gravel cushion foundation placed upon sound soil cut true and even so that the pipe will have a bearing for its full length. Gravel cushion to be in accordance with the 1972 Minnesota Standard Specifications for Highway Construction, Section 2502.2, Subdrainage Backfill. Pipe to be located in rock or soils with rock, shall be laid on a 12" minimum thickness sand foundation with at least 12" of sand at sides. At any area where soil stability is unsuitable or questionable, the Contractor shall further excavate until stable soil is reached. Contractor shall then backfill with compacted granular material until proper elevation is reached.

D. All backfill shall be clean granular fill (See Section 02200) compacted in 8" lifts to 96% standard Proctor density (ASTM D-698-70).

E. The Owner shall retain an independent testing laboratory which shall provide the following tests:

1. Soil analysis of four samples which represent backfill material.
2. Field density tests of the compacted backfills in accordance with ASTM D1556. (One test on every third lift for every 100 feet of trench.)

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes performing all labor and furnishing all piping materials, fittings, joining methods, protection and pressure for piping used on this project to connect all fixtures and equipment, pipe and fittings of material and type for various services as list below:

C. Related work specified elsewhere:

1. Basic Materials and Methods: Section 15100.

## PART 2: PRODUCTS

2.1 PLUMBING PIPE AND MATERIALS

## A. Waste Piping

## 1. Pipe

a. Underground - pipe sizes 8" and under shall be service weight cast iron pipe with hub and spigot joints and fittings; pipe sizes 10" and over shall be Class 56 very, extra heavy ductile iron pipe with hub and spigot joints and fittings. Joints shall be made using preformed molded rubber rings. Seal rings shall conform to ASTM 564-65 requirements.

b. Above grade in building - service weight cast iron with caulked joints. Piping under 2" shall be Schedule 40, galvanized steel with screwed joints. Fittings shall be of the same material as the pipe. Hubless cast iron soil pipe and fittings are permitted. Mechanical joints for hubless cast iron system shall be made by using neoprene sleeve and stainless steel as specified in CIPI standard 301.

B. Vent Piping

1. Pipe - Schedule 40 galvanized steel. (Hubless cast iron is acceptable).
2. Fittings - cast iron
3. Joints - screwed, caulked.

C. Rainwater Drainage

1. Pipe - Schedule 40 galvanized steel.
2. Fittings - black cast iron drainage.

3. Couplings normally furnished with lengths of pipe shall not be used in the installation of threaded piping. Extra heavy steel, malleable or drainage couplings shall be used.

4. Victaulic fittings and companion flanges may be used in lieu of screwed fittings as specified above for fittings. Couplings shall be Victaulic Style 77 and/or Style 75 with malleable iron castings and Victaulic grade "H" molded synthetic rubber gasket.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes all piping system specialties required to place the mechanical systems in complete working order.

C. Related work specified elsewhere:

1. Basic Materials and Methods: Section 15100

## PART 2: PRODUCTS AND INSTALLATION

2.1 PIPE SLEEVES

A. Provide sleeves for all pipes that pass through walls, slabs or partitions. Sleeves shall be set and maintained in place by this contractor during the progress of the work. All sleeves shall be cut from new material, cut square and reamed.

B. All pipe sleeves through walls, slabs or partitions shall be 1/2" greater in inside diameter than the external diameter of pipe passing through sleeve except for insulated piping where sleeve shall be large enough to allow for insulation on the piping.

C. All sleeves through partition walls shall be Schedule 40 steel pipe extending full thickness of partition and shall be flush with the finished surface.

D. Sleeves through floor slabs for concealed piping shall be constructed of Schedule 40 steel pipe and shall extend 1/2" unless detailed otherwise above finished floor in classrooms, offices, corridors, etc.

E. Sleeves through roof slabs shall be constructed of Schedule 40 steel pipe.

2.2 FLEXIBLE PIPE CONNECTORS

A. Provide flexible pipe connectors where shown on the drawings in the rain-water drainage piping.

B. Flexible connectors shall be Quiet-Flex rubber expansion joints as manufactured by Vibration Mountings Inc. Connectors shall be single arch, of rubber construction with a minimum face-to-face dimension of 6". Flexonics, Garlok and Resistoflex are approved equals.

C. Flexible connectors shall be installed using standard pipe flanges. Control rods shall not be used. The pipes joined by the flexible connectors shall be supported with three feet on both sides of the connector.

## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the furnishing and installing of hangers and supports as required to install all lines under contract.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Pipe and Pipe Fittings: Section 15110.
3. Piping Specialties: Section 15130
4. Mechanical Systems Insulation: Section 15160.

D. Hangers shall be of proper strength and placed on correct centers to support the lines with no sagging. (See Schedule below). Any additional steel members required to run the pipes or where indicated on drawings shall be furnished and installed by this Contractor.

E. Pipe hangers and supports may be secured to steel trusses or beams by welding or using toggle expansion bolts, impact type fasteners or through bolts, as conditions require. Grinnell Fig. 66 welded beam attachment shall be used for large diameter pipes.

F. Where hanger attachments are welded to beams or trusses the attachment shall be fireproofed equal to supporting members.

## PART 2: PRODUCTS AND INSTALLATION

2.1 PIPE HANGERS AND SUPPORTS

A. All individual pipes 3" and smaller shall be supported with Grinnell ring type No. 107-R, or approved equal; larger pipe shall be supported with Grinnell Company #260 or approved equal. Clevis hangers as required of sizes to span the insulated pipe. Elcen, Carpenter and Patterson or Fee and Mason of identical type are approved equal. Hangers that support copper pipe shall be copper-plated.

B. Unistrut, Powerstrut or Grinnell vertical and horizontal structural supports shall be used with sufficient anchorage to side walls using inserts and anchor bolts. Any inserts or cinch anchors for pipe hangers shall be furnished and set in place by this Contractor unless otherwise noted. Where

clearance conditions dictate that a Fig. #260 clevis hanger cannot be used, this Contractor shall use the Fig. #171 or 175 pipe rolls.

C. Trapeze hangers shall be Unistrut channels at 8'-0" o.c. Pipe straps shall be Unistrut P2558. Provide provisions for building in pitch as required. Support members in trapeze hangers shall not be a torch cut. On trapeze hangers provide full circle shield and U-clamp pipes to trapeze. U-clamps shall be Unistrut P-1109 through P-1126.

D. Hangers for insulated piping shall be large enough to encompass insulation and metal shield for same. Provide at hanger points hydrous-calcium silicate insulation in sections 2" longer than hanger shield. insulation shall have same finish as adjacent covering.

E. Shields shall be provided for all insulated piping at hangers or trapeze bars. Shields for 6" pipe and smaller shall be constructed of 16 gauge galvanized iron. Shields shall be 6" longer than pipe diameter; however, the shielding shall be a minimum of 6" long and a maximum of 18" long. Shields shall completely encompass the covering when pipes are U-clamped to trapeze hangers. All other shields shall cover only the bottom half of the pipe covering.

F. Vertical pipes shall be supported at each floor by riser clamps.

G. Contractor shall consult and cooperate with all other contractors in arrangements of and routing of all supported lines so as to provide maximum clearances, minimum interference and a neat, first-class appearance and accessibility.

H. The following schedule shall be used in establishing distances between supports for steel pipe. When different sizes of pipes are supported on a common hanger, smallest size line shall govern unless an intermediate support is used.

<u>Pipe or Tube Size</u>	<u>Hanger Spacing</u>	<u>Minimum Rod Diameter</u>
1/2" tube only	5'	1/4"
1/2" - 1"	7'	3/8"
1-1/4" - 1-1/2"	9'	3/8"
2"	10'	1/2"
2-1/2"	11'	1/2"
3"	12'	1/2"
4"	14'	5/8"
5"	16'	5/8"
6"	17'	3/4"
8"	19'	7/8"

I. Pipe hangers and spacing for sewer and waste lines shall be as listed above except that horizontal runs of cast iron piping shall be supported at least once for each pipe section.

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## PART 1: GENERAL

1.1 SCOPE

- A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.
- B. Work under this section includes the thermal insulation of cold piping.
- C. Related work specified elsewhere:
1. Basic Materials and Methods: Section 15100.

1.2 DEFINITIONS

- A. Concealed insulated surfaces shall mean piping, ductwork and equipment located above suspended ceilings, and in chases.
- B. Exposed insulated surfaces shall mean piping, ductwork and equipment located in mechanical rooms, tunnels and rooms or parts of rooms without suspended ceilings, etc.

## PART 2: PRODUCTS AND INSTALLATION

2.1 APPLICATION

- A. Insulation shall be applied to clean, dry surfaces with pipe surfaces at room temperature. Insulation shall be butted firmly together. Longitudinal and end joints shall be sealed with compatible jackets, facings and adhesives.
- B. Insulation shall be continuous through sleeves at wall and ceiling openings.
- C. Metal shields shall be provided under Section 15140 for installation at insulated piping hangers.

2.2 INSULATION MATERIALS

- A. Insulation materials shall be furnished by Johns-Manville, Owens-Corning Fiberglas, Baldwin-Ehert-Hill, Certainteed Saint Gobain, or approved equal.
- B. Adhesives, mastics and coatings shall be furnished by Benjamin Foster (B.F.) Insul-Coustic (I.D.), Chicago Mastic (CMC) or approved equal.
- C. All insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as tested by procedure ASTM E-84, NFPA 255 and UL 723. Flame spread rating shall not exceed 25 and smoke developed rating shall not exceed 50 or in the case of flexible insulation as specified herein (Armstrong FR Armaflex) flame spread rating shall not exceed 25 and smoke developed



rating shall not exceed 150. Accessories such as adhesives, mastics, cements, tapes, glass fabric and asbestos cloth for fittings shall have the same component ratings. At cold equipment as stated in Article 2.6 a 3/4" thick FR Armaflex with a flame spread of 25 and a smoke developed rating of 225 will be acceptable.

D. Calcium silicate rigid inserts shall be installed at all outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid pipe insulation of equal thickness to the adjoining insulation and shall be provided with vapor barrier where required. Insulation inserts shall not be less than the following lengths:

1/2" to 2-1/2" pipe size	12" long
3" to 6" pipe size	15" long
8" to 10" pipe size	18" long
12" and over pipe size	24" long

E. P.V.C. Insulated Fitting Covers: Fittings where indicated herein, shall be finished with preformed fitting covers equal to J.M. Unifit, Zeston or Speed Line.

### 2.3 JACKETS AND FACINGS

A. Where a jacket is specified, the insulation jacket for fiberglass insulation shall be an all service jacket. Jackets and end laps shall be sealed with Insul-Coastic 215 adhesive or Chicago Mastic 17-465 adhesive applied to two surfaces or with self-sealing type lap system.

B. Insulation on all cold surfaces where vapor barrier jackets are used shall be applied with a continuous, unbroken vapor seal.

### 2.4 COLD PIPING

A. Horizontal downspout offsets (including 1' above and 1' below horizontal) and horizontal pipe from drains receiving condensate from cooling coils shall be insulated.

B. The insulation shall be sectional type fiberglass pipe insulation and shall have an average thermal conductivity not to exceed .23 BTU inch per square foot per degree F. per hour at 75 degrees temperature. Insulation shall be 1" thick all pipe sizes and 3#/cu. ft. Exposed and concealed piping shall have all service jacket. Fittings, valve bodies, flanges, etc. shall be insulated with fabricated insulation of the same material and thickness equal to adjoining pipe insulation (mitered pipe insulation segments) secured with 3 ply jute twine and finished with one coat of mineral fiber cement. Apply P.V.C. cover over fittings with C.M.C. adhesive 17-465 on the throat and secure it with adjacent pipe covering. Further secure with two wraps of 1-1/2" wide Unifit tape. Stapling of vapor barrier jacket will not be allowed.

### 2.5 COLD EQUIPMENT

A. Roof drain bodies shall be insulated as follows: Insulation shall be flexible foamed plastic sheet insulation. Minimum density shall be six pounds

per cubic foot. Insulation thickness shall be 3/4". Apply brush coat of O.C. 500, Armstrong 520, C.M.C. 170462, JM #67 adhesive to metal surface and also to back of foamed plastic sheet. After adhesive has dried to non-tacky state, press sheet firmly in place. All edges shall be coated with adhesive and pressed firmly together with 1/4" overlay pressure. All joints shall be staggered.

B. Provide a glass fabric jacket imbedded in a coat of vapor barrier mastic and then apply a finish coat of vapor barrier mastic.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing all equipment, materials and performing all labor necessary to connect the soil and waste piping systems and other related systems.

C. Related work specified elsewhere:

1. Basic methods and materials: Section 15100.
2. Pipe and pipe fittings: Section 15110.

## PART 2: PRODUCTS AND INSTALLATION

2.1 GENERAL

A. All floor drains provided under this contract shall be of Josam Manufacturing Company, Jay R. Smith, Blake, Wade Manufacturing Company, Zurn Industries or approved equal, of type and size specified or indicated on the drawings. Except where otherwise specified or indicated, strainers for 2" floor drains and 3" floor drains shall be at least 7" in diameter and for 4" floor drains strainers shall be at least 9" in diameter. Drains shall have nickel bronze strainers unless otherwise specified. Floor drains in floors resting on earth shall have spigot or hub outlet for caulked joint. The following numbers are taken from the Josam catalog.

B. Floor drains shall have threaded, spigot or hub outlet as required for proper connection to piping and shall be provided with a trap having a cleanout. There shall be no threaded auxiliary inlets in the ground. Drains installed in connection with waterproofing membrane, copper or lead flashing shall be provided with drainage flange, weepholes and flashing clamp.

C. The Contractor shall provide 16 oz. copper flashing or 8# lead flashing to extend 12" from clamping ring on all floor drains other than floor drains in slab on earth.

2.2 FLOOR DRAINS IN FLOORS ON GRADE

A. Mechanical Equipment Rooms: Josam No. 850-J coated 3" cast iron combined floor drain and integral deep "P" trap with spigot connection and polished brass strainer.

## 2.3 FLOOR DRAINS IN FLOORS ABOVE GRADE

A. Mechanical Equipment Room: Josam No. 302-36A cast iron floor drain; two piece body with double drainage flange; wejloc non-puncturing flashing collar, weepholes; bottom outlet inside caulk connection; round top and deep set tractor grate. Josam No. 1910 cast iron deep seal "P" trap, female inlet and outlet with cleanout plug.

## 2.4 CLEANOUTS

A. Cleanouts, placed in accessible locations, shall be provided in all drainage lines where indicated on the drawings and where necessary to permit rodding out of the entire drainage system. Cleanouts shall be provided at the base of each soil or waste stack and at the base of each downspout riser.

B. Cleanout plugs and tees for bell and spigot piping shall have a cast iron body and a Minneapolis pattern cast brass plug. On threaded piping, cleanouts shall consist of a Minneapolis pattern cast brass plug screwed into a suitable fitting. Cleanouts on piping installed in inaccessible furred spaces above inaccessible ceiling or below floors on grade shall be provided with extensions to bring cover flush with finished wall or floor.

C. Cleanouts in unfinished floors shall be Zurn Manufacturing Co. model ZN-1326-10 bronze plug cleanout with cast iron frame, heavy duty grate and anchorage lugs. Products as manufactured by Josam, Jay R. Smith, Blake or Wade are acceptable.

## 2.5 SUMP

A. Provide a 36" diameter cylindrical, cast iron sump where indicated on the drawings. Sump shall have a 2" flange to receive a cover in the future. Flange shall have eight evenly spaced 5/8" diameter threaded holes on a 38-1/4" bolt circle to accept a future duplex tank cover.

## 2.6 ROOF JACKETS

A. Vent stacks from sewer, soil, waste and drain lines shall be extended at least 12" above roof, and shall be encased in frostproof jackets, Moore, Sure Seal or equal, each having an air space of at least 1" between the outside surface of pipe and inside surface of frost jacket. The top of the frost jacket shall be designed as to permit the insertion therein of a testing plug of such form that it can be readily seen until removed, and said plug shall be removed at once after a final inspection has been made and approved by Engineer. Vent pipe shall be cast iron where same passes through roof slab.

B. Roof jackets shall be constructed of 16 oz. copper for all pipes sizes 6" and smaller, and 20 oz. copper for all pipes larger than 6".

## 2.7 MANHOLES

A. Furnish and install where shown and as detailed on the drawings, as part of the sanitary sewer system, manholes by the Cretex Companies, Inc., or equal. Manholes shall be a prefabricated, reinforced poured concrete ring type.

## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract and Division 1 - General Requirements apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes furnishing all equipment, materials and performing all labor necessary to connect the Roof and Area Drainage Systems and other related systems.

C. Related work specified elsewhere:

1. Basic Methods and Materials: Section 15100.
2. Pipe and Pipe Fittings: Section 15110.
3. Mechanical Supporting Devices: Section 15140.
4. Mechanical Systems Insulation: Section 15160.

## PART 2: PRODUCTS AND INSTALLATION

2.1 GENERAL

A. All roof and area drains furnished and installed under this contract shall be as manufactured by Josam, Zurn, Blake, Jay R. Smith, or Wade. Drains shall be of type, material and construction indicated.

B. Roof flashing furnished under the General Contract.

C. The drains scheduled herein are of types as designated and sized on the drawings. Refer to architectural drawings for exact locations and elevations of all drains.

2.2 ROOF DRAINS

A. Under roof insulation option A (insulating fill) provide Josam series 21000 cast iron roof drain with large sump, caulked outlet, large dome metal strainer, flashing clamp and gravel stop.

B. Under roof insulation option B (tapered rigid insulation) provide Josam series 21500 cast iron roof drain with large sump, caulked outlet, large dome metal strainer, flashing clamp and gravel stop.

C. Refer to specification Section 07241 and details 4/A-2 and 12/A-8.

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ELECTRICAL SPECIFICATIONS

JACKSON OWRE MILLARD LYON COMPLEX REMODELING  
CONTRACT A (JOML-A)  
MINNEAPOLIS CAMPUS  
UNIVERSITY OF MINNESOTA  
COMMISSION NUMBER 280.01  
PROJECT NUMBER MINN. BHRD-HP-5C-070

James F. Brinkerhoff  
Vice President for Finance and Development      University of Minnesota

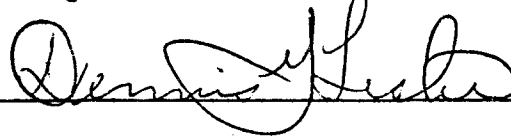
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THE ARCHITECTS COLLABORATIVE, INC.      Cambridge, Massachusetts

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Hammel Green and Abrahamson, Inc.      Saint Paul, Minnesota  
Setter, Leach and Lindstrom, Inc.      Minneapolis, Minnesota

I hereby certify that these plans, specifications or reports were prepared by me or under my direct supervision, and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.



Date: July 20, 1976

Reg. No. 9112

## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 16010 General Provisions - Electrical apply to all work of this Division. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Provisions of this section apply to all work of the Electrical Contractor.

1.2 CODES AND STANDARDS

A. The entire installation shall meet all requirements of the 1975 National Electrical Code (NFPA 70) and all State and local regulations as they may apply. Standards of the following associations or organizations shall be followed and applied where applicable as minimum requirements.

- (UL) Underwriters Laboratories
- (NEMA) National Electrical Manufacturers Association
- (OSHA) Occupational Safety and Health Act of 1970  
National Electric Safety Code (Handbook H30) of the National  
Bureau of Standards

B. The rules and regulations of the University of Minnesota Physical Planning and Development Department shall be checked and complied with where applicable.

1.3 PERMITS AND LICENSES

A. All licenses shall be secured and paid for by this Contractor before actual work is started and he shall observe any requirements stipulated thereon. The University will obtain required permits from the State and Municipality.

1.4 INSPECTION

A. The installation shall be made in a neat and workmanlike manner by persons licensed and skilled in the trade and shall be done under the Supervision of a master electrician licensed to do work in the State of Minnesota.

B. All electrical work or wiring accomplished on University of Minnesota property shall be inspected by a University Electrical Inspector. The electrical contractor shall file a University of Minnesota Request for Electrical Inspection. The request forms are available from the Engineering and Construction Division of the Physical Planning Department and will normally be given to the Electrical Contractor at a pre-construction meeting.

C. No project consisting of electrical work or wiring shall be installed until a request is on file with the Engineering and Construction Division, Electrical Inspection Office. The Electrical Contractor shall retain a copy of the request, which has been signed by the University Electrical Inspector.

D. Requests for electrical inspection will give the phone number to call for all inspections required by the Office of Electrical Inspection. A request for final inspection shall be made within 48 hours of project completion.

E. A permit number for the project will be assigned to the Request for Inspection by the University. A permit application will be made and fee paid to the University Building Official by the appropriate University departments and will not be the contractor's responsibility.

F. All requirements of the latest Minnesota State Building Code applicable to electrical installations will be enforced.

#### 1.5 GUARANTEES AND TESTS

A. All wiring shall be tested for opens, shorts and grounds with megger equipment prior to acceptance. Contractor shall be responsible for proper installation of all items in this Contract and shall remedy, free of charge, any defects in materials and workmanship and repair all damage resulting therefrom in accordance with provisions of the General Conditions.

B. Incandescent lamps are excluded from the provisions of guarantees, but they shall not be installed until final completion of the project to replace the temporary incandescent lamps used for construction lighting.

#### 1.6 DIMENSIONS AND CORRELATION

A. For the purpose of clearness and legibility the drawings are essentially diagrammatic and are intended to indicate size, capacity and location but not exact details or arrangements of construction. Architectural, mechanical and structural drawings shall be examined so that all details of the project are understood and work procedures known before bid and installation. Exact locations and details shall be obtained from dimensioned drawings but shall not take precedence over field dimensions.

B. Miscellaneous equipment (pull boxes, junction boxes, fittings and expansion joints) necessary to complete the work satisfactorily shall be furnished and installed even though not specifically shown on plans.

C. This Contractor shall cooperate with other contractors for proper anchorage, placement and accomplishing of all work. In general, plumbing and ventilating lines are laid out first. Interference between the work of the various contractors shall be resolved before installation. In the event of conflict of space requirements or location with other trades, he shall refer the matter to the University for decision.

#### 1.7 CUTTING, PATCHING AND DEMOLITION

A. This Contractor shall be responsible for all necessary cutting and patching required in connection with his work and where necessary because of removal or change or existing work. Cutting of structural members and finished surfaces shall not be allowed without permission from the Architect or Structural Engineer. These cutting and patching requirements will be modified only if general construction specifications and drawings specifically and clearly state that certain or all portions of same required for each of the various trades is to be performed by the General Contractor.



B. This Contractor shall remove existing electrical conduits, wires, fixtures, boxes, and wiring devices from the existing construction to accomplish the work as shown on the plans. Electrical equipment not shown to be reused shall remain the property of the University and shall be salvaged or removed from the site as specified in Article 1.8 of this Section of the specification. Abandoned conduit in ceilings, walls and floor slab shall be cut off below new finish line to allow new finish surface to be applied. Contractor shall verify that circuits or wiring removed do not interrupt service of any kind beyond the remodeled area. If necessary, Contractor shall re-route conduit and wire to maintain services to areas beyond the remodeled spaces.

C. The Electrical Contractor shall repaint all areas where he has performed cutting and patching at rooms, spaces or locations that are not repainted under the General Contract. Generally these will be locations where no demolition, cutting and patching is performed by the General Contractor.

D. Contractor shall carefully review the Contract Documents, for all other contractors with respect to coordination of the demolition, removal and remodeling work. Cutting and patching to expose and remodel existing mechanical or electrical systems shall not be construed as the work of another contract unless specifically called for on another contractor's documents.

E. Refer to General Construction Specifications for execution and requirements for patching and painting and comply with applicable provisions as to materials and workmanship.

#### 1.8 SALVAGEABLE MATERIAL AND EQUIPMENT

A. All existing electrical materials and equipment are to be removed by this Contractor and shall remain the property of the University unless indicated otherwise by the University.

B. Removed materials and equipment that the University no longer wishes to retain shall become the property of the Contractor, and he shall dispose of it off the University of Minnesota's property at no additional cost to the University.

C. Any removed materials and equipment to be delivered to the University shall be delivered to the following address:

University of Minnesota  
Como Yard  
3009 Como Avenue Southeast  
Minneapolis, Minnesota 55414

1. All materials and equipment delivered or returned to Como Storage Yard shall be in the same condition it was prior to being removed from project sites or Como Storage Yard.

2. Delivery shall be made to the Como Yard during regular working hours or as the University may direct. The Como Yard has personnel and equipment to handle the material delivered to the Yard.

D. All removed materials and equipment shall be tagged with the following information.

1. General description.
2. Location removed from.
3. Date removed.
4. Contractor's name.

E. When removing existing equipment and material, the Contractor shall take particular care to prevent damage to or loss of equipment and material which are to remain.

#### 1.9 CLEANING

A. The Contractor shall periodically remove waste and rubbish and maintain order. Premises shall be left clean and free of debris and unused construction materials before acceptance. Refer to General Requirements and comply with applicable provisions.

B. All electrical materials, equipment and apparatus including light fixtures and lamps shall be thoroughly cleaned, to be free of dust, dirt, rust and foreign materials before acceptance.

#### 1.10 PAINTING AND LABELING

A. All equipment furnished under this Contract shall be factory finished and painted or galvanized. Any marred finishes on this equipment shall be painted to match as a responsibility of this Contractor.

B. Provide typewritten card index with plastic cover describing circuits in each panelboard.

C. Provide engraved 1/8" black-white-black laminated bakelite or plastic labels securely fastened with screws or escutcheon pins to identify electrical equipment as follows:

1. Panelboard name, and voltage fastened on inside of hinged door.
2. All main power and special system junction boxes. Locate these on the inside of flush boxes and in finished areas and outside of the box where they are surface mounted or in equipment spaces.
3. Plastic imprinted adhesive labels (Dyno Tape) will not be acceptable except for Item (2).

#### 1.11 QUALITY AND WORKMANSHIP

A. All materials shall be new, free from defects and shall be listed by, or bear the Underwriter's label where subject to such approval. Materials shall be of the same manufacture or brand for each type of material unless designated otherwise.

B. All materials and finishes shall be adequately protected during construction, from moisture, temperature extremes and physical abuse. All materials shall be assembled in a workmanlike manner in accordance with current recommended standard practice. Certain work such as painting, patching, core drilling and welding shall be done at the Electrical Contractor's direction, responsibility and expense but accomplished by workmen skilled in the particular trades.

#### 1.12 SHOP DRAWINGS

A. Refer to Section 01300.

#### 1.13 LIST OF MATERIALS, LIST OF SUBCONTRACTORS AND OTHER SUBMITTALS

A. Refer to Section 01300.

#### 1.14 SAMPLES

A. Refer to Section 01300.

#### 1.15 OPERATION AND MAINTENANCE INSTRUCTIONS AND AS-BUILT DRAWINGS

A. Refer to Section 01700.

#### 1.16 TEMPORARY ELECTRIC SERVICE AND LIGHTING

A. This Contractor shall install temporary secondary electric services and lighting for new construction as outlined in Temporary Facilities, Section 01500 and herein.

B. Provide from existing J.O.M.L. service temporary secondary electric centers as herein described for the Tower construction area.

1. Each temporary service center shall be nominal 60 ampere, 120/208 volts, 3 phase, 4 wire. At each location, provide a 12 circuit load center panel, 12-20 amp, 1 pole breakers. From each load center panelboard install a receptacle panel consisting of 6-20 ampere, 120 volt, 3 wire grounding type duplex receptacles. Each receptacle shall be served by a separate circuit. Provide GFI breakers or receptacles as required by code.

Load centers and receptacle panels shall remain for next phase of construction. Load centers have been shown on the plans as panels BT-1 and BT-2.

C. Within the construction area provide a sufficient number of rubber covered lamp sockets uniformly spaced so that in general 200 watt lamps (maximum) will provide satisfactory lighting on temporary cable connected to the temporary service and located for all trades. Lighting shall be adequate to provide suitable working conditions for high quality workmanship, and safe lighting conditions. All trades will provide their own portable cords and outlets in the building for portable tools. All light bulbs will be furnished by General Contractor, but shall be installed, removed and reinstalled as burn outs occur by the Electrical Contractor.

D. The entire installation of construction light and power shall meet code requirements and shall be safe, substantially supported and adequately connected.

E. Temporary electric energy costs will be paid by the University. Electric service and energy costs for heavy electrical loads such as large welders shall be provided by each Contractor and shall not be taken from this service. The energy demand shall not exceed the service and any damage resulting from misuse, overloading or faulty equipment shall be paid for by the responsible persons.

F. After the electrical installations are complete, prior to occupancy and when approved by the University, all temporary lighting shall be removed by the Electrical Contractor.

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## PART I: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division I General Requirements and Section 16010 General Provisions - Electrical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements of pre-bid and postbid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes the basic construction materials for erection and installation of the building electrical systems.

2.1 RACEWAYS AND FITTINGS

A. All electrical conduit shall be galvanized rigid steel conduit, except that EMT 1-1/4" or smaller may be used in furred ceilings, interior partitions, walls or where exposed and not subject to mechanical injury. EMT shall not be used in poured concrete construction. Intermediate metal conduit (IMC) may be used in lieu of rigid steel conduit where approved by code for the purpose. No conduit smaller than 3/4" shall be used except by specific instruction from the Engineer or where noted on the plans or specifications.

B. All steel conduit and all locknuts, fittings, couplings, nipples and connectors shall be protected from corrosion by hot dip galvanizing or cadmium coating both inside and out, except electrical metallic tubing shall have only enamel or epoxy coating on the interior. All rigid conduit shall have standard pipe threads.

C. All conduits crossing building expansion joints shall be provided with O.Z. grounding type expansion fittings, Type EX or AX.

D. Conduits shall be dried, cleaned and de-burred before wire is pulled. Standard locknuts and fittings shall be used with rigid conduits, O.Z. Type A or B insulated steel bushings shall be used on all 1-1/4" or larger conduits. Terminations at cabinets and junction boxes shall be with double locknuts and phenolic bushings (1" and larger).

E. All conduit shall be concealed in ceiling, floor or wall construction in finished areas. In unfinished areas exposed conduit shall be installed parallel to walls and floor and shall be supported in a substantial manner with pipe straps expansion bolts, screws, lag screws, clamps, minerallac clamps or Kindorff or Unistrut trapeze hangers.

<u>Conduit Sizes</u>	<u>Maximum Spacing of Supports</u>
3/4" and under	7 feet
1" and over	10 feet

F. Condulets shall not be used for 1-1/2" or larger conduits. EMT conduit fittings shall be raintight gland compression type or equivalent approved by the Engineer. Indenter, set screw or slip-on types are not acceptable. Couplings and connectors shall be malleable iron or steel.

G. Provide expansion fittings between existing building and new tower. Seal conduit systems exposed to wide variations in temperatures.

H. Conduit shall be Youngstown, Republic, Allied or equal.

## 2.2 OUTLET, JUNCTION AND PULL BOXES

A. All outlet boxes shall be galvanized. Standard 4" octagonal boxes shall be used for ceiling outlets except as otherwise specified or required. Outlet boxes shall be secured by wood screws, machine screws, toggle bolts or lead anchors as applicable. All boxes shall be supported independently of support from connecting conduit.

B. Square boxes with industrial covers shall be used for exposed wall outlets.

C. Covers shall be provided for all outlet boxes, as required, and shall be of a design to fit the particular box and location.

D. All pull boxes are not shown on the plans but they shall be provided as required for ease of wire pulling and in long runs (90 feet or more), or when more than four quarter bends shall occur in any conduit run. All pull boxes shall be sized to conform to requirements of the National Electrical Code. Pull boxes shall be recessed in all finished portions of building.

E. All junction and pull boxes shall be accessible and permanently labeled to identify the system and wiring within.

F. Outlet boxes shall be Appleton, Steel City, Raco, or equal.

## 2.4 WIRE AND CABLE

A. All wire and cable furnished and installed under this contract shall be new and of the best quality. Wire and cable shall be of size, type and number shown on plans. All conductors shall be of annealed copper of not less than 98% conductivity and in all other respects to the requirements of the ASTM specifications, latest edition. Unless otherwise noted, insulation shall be rated at 600 volts.

B. All branch circuit wiring shall be color coded according to Article 210-5 of the National Electrical Code and as follows:

1. 120/208 volt: A - black; B - red; C - blue; Neutral - white;  
Ground - green; travellers - yellow.

2. All feeders if not color coded shall be permanently marked with paint or tape at their terminations for identification.

C. All feeder wire shall be type THW and branch circuit wire shall be type THW or THWN-THHN, unless indicated otherwise, of sizes shown on plans. All wire Number 8 and larger shall be stranded. Unless indicated otherwise, no wire smaller than Number 12 shall be used for branch circuits. Number 14 may be used for relay and motor control.

D. Interior helical spring twist type connectors shall be used on Number 8 and smaller wire sizes. These shall be Ideal 70 or 450 Series, Scotchlocks or approved equal.

E. Number 6 and larger wires shall terminate in solderless lugs. All terminations taps and splices shall be compression type Burndy, Hydent or approved equal.

F. No splices shall be made in any branch circuit conductor except when absolutely necessary and then in approved junction or pull boxes. Secondary service wires and feeders shall be of one continuous run without splices.

G. To relieve strain on the insulation and the conductors when pulling wire, a wire pulling lubricant shall be used, powdered soapstone or approved equal.

H. Wire and cable shall be Continental Cable, General Electric, Cypress/Rome, Triangle, Crescent, Anaconda or equal.

## 2.5 GROUNDING CONTINUITY

A. All conduit systems, equipment housings, material housings, junction boxes, cabinets, motors, ducts, wireways, light fixtures, portable equipment and all other conductive surfaces shall be solidly grounded in accordance with the National Electrical Code to form a continuous, permanent and effective grounding system.

## 2.6 FASTENERS AND SUPPORTS

A. All fastenings and supports shall be of an approved type. The use of wire nails, etc., for fastening exposed conduits is prohibited. Threaded inserts, expansion or toggle bolts shall be used for fastening to masonry walls.

B. Where possible conduits shall be grouped together and rigid racks of angle iron or structural channels shall be provided. Individual conduits shall be clipped to the ceiling or wall with malleable iron pipe straps wherever possible. Where individual conduits must be hung from the ceiling, approved conduit supports and rod hangers must be used.

C. All wood panels shall be 3/4" minimum thickness plywood; all panels shall be provided with two coats of fire-retardant enamel on both sides and edges. Plywood shall be Building Grade with Pine or Fir finish on both sides.

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## PART 1: GENERAL

1.1 SCOPE

A. Conditions of Contract, Division 1 General Requirements and Section 16010 General Provisions - Electrical apply to all work of this section. Refer to Article 12 of the Instructions to Bidders, Article 7 of the General Conditions and Section 01010 - Summary of Work and Special Requirements for requirements on pre-bid and post-bid evaluation of proposed substitute products, methods and other conditions.

B. Work under this section includes all secondary electrical distribution equipment and accessories herein specified and shown on plans to provide a complete connected and fully operating system.

C. All equipment and wiring shall be designed and connected for operating on a 120/208 volt, 3 phase, 4 wire, secondary system.

## PART 2: PRODUCTS AND INSTALLATION

2.1 SECONDARY VOLTAGE INTERRUPTIONS

A. Electric service interruptions involving University property or required by the contractor to perform his work shall be arranged for and approved by the University before interruption.

B. Requests for outages shall be submitted in writing to the University's Electrical Construction Superintendent for approval at the earliest possible date, and in no case later than two weeks prior to the outages. Proposed outages information shall be submitted on a University of Minnesota "Request for Electric Outage" form (3 copies) available from the University's Electrical Construction Superintendent.

C. The Electrical Contractor shall verify with the University's Electrical Superintendent that all equipment and installation involved is completed, tested, and ready for service and that all related shop drawings and operational data have been submitted before submitting the outage.

D. Scheduled outages will be scheduled at the convenience of the University. The University reserves the right to cancel or change the scheduling of any such outage up to 24 hours before its previously approved starting time. There shall be no additional cost to the University for scheduled outages, or for outages rescheduled at the University's request where at least 24 hours notice has been given by the University to the Contractor.

E. All outages shall be held during evenings or on weekends and/or holidays. The Contractor shall figure these costs at premium pay rates. No cost extra will be allowed because the outages or the work during the outages in on an overtime basis.



## 2.2 EXISTING BRANCH CIRCUIT PANELBOARD

A. Certain existing branch circuit panelboards as indicated on the drawings shall be used to provide power to the towers. Provide new circuit breakers where indicated.

B. All new circuit protective devices for existing panelboards shall be front removable bolt-in molded case circuit breakers with thermal magnetic trips for 120/208 volt sized as indicated in the panelboard schedule. All two and three pole circuit breakers shall have common trips. 120/208 volt breakers shall be rated for 10,000 amperes, sym. I.C. at 240 volt RMS and shall match existing panelboard and circuit breaker. Refer to plans for panelboard manufacturer.

C. Electrical Contractor shall verify circuit breaker availability and compatibility for each panelboard and circuit breaker type.

## 2.3 PANELBOARDS

A. Panelboards shall be the dead front type with mains arranged as shown on the panelboard schedule for 120/208 volt, 3 phase, 4 wire, wye connection. Enclosures shall be code grade steel complete with door-in-door type trim. The inner door shall be the locking type and the outer door shall be secured by trim type screws on the side opposite the hinge. Circuits shall be listed on clear plastic covered, typewritten card indexes attached to the inner side of the inner doors. Each protective device shall be designated by a number at the device. Final room numbers as provided by the Owner shall be used for all circuit indexes.

B. Panel bus bars shall be solid copper and shall be aligned and rigidly supported on back pan by insulators connected to a removable mounting panel. All lugs shall be copper-bronze for bolted lug connection. Each panelboard shall contain individual insulated neutral bus of same ampacity as the main bus. All circuit breakers shall be attached to bus by means of machine screw connections, and shall be removable from the front without de-energizing the panel. Rough-in boxes shall have a minimum width of 20 inches and minimum depth of 4-1/2 inches. Full length vertical buses and cross breaker connection including all hardware shall be provided and installed in all future circuit breaker spares and spaces. All panelboards shall be keyed with identical Corbin Lock #157-67, using WEM-1 key.

C. Each panelboard shall be identified with a black-white-black laminated plastic plate attached to the inner trim. Letters and numbers shall be cut through the black and into the white of the plate. Inscription shall be symmetrical about the centerline of the plates, and plates shall be attached with self-tapping screws. Identification shall correspond to designations used in the specifications and on the plans, and indicate switchboard where service originates.

D. Panelboards shall be dead front type with front removable bolt-in circuit breakers with thermal magnetic trips of sizes scheduled on plans. Contractor shall provide a suitable circuit breaker sized for the load for each branch circuit shown on the plans if inadvertently not identified or noted in the panelboard schedule. Panelboards shall be designed for 120/208 volt, 3 phase, 4 wire, wye connected, solid neutral. Panelboards shall be General Electric Type NLAB or equivalent.

E. Circuits shall be connected as shown on the plans for a balanced three phase load. Circuit breaker number for all 3 pole and 2 pole breakers shall have numbers sequenced as follows: 3 pole breaker shall be labeled, 1, 3, 5. Typewritten index shall have corresponding numbers in sequence to allow labeling of a 3 pole circuit without spaces between these numbers.

F. All circuit protective devices shall be molded case circuit breakers with thermal magnetic trips for 120/208 volt as indicated. All two and three pole circuit breakers shall have common trips.

1. Circuit breakers shall conform to the following minimum characteristics based upon General Electric nomenclature:

a. Branch Circuit Panelboards, 120/208 volt.

<u>Amps</u>	<u>Volts</u>	<u>Frame</u>	<u>Sym. I.C. - RMS - 240V</u>
15-100	240	THOB	10,000

G. Panelboards shall be Square D, Westinghouse, General Electric, I.T.E., Federal Pacific or approved equal. Manufacturer's shop drawings shall include busing details, mounting methods and lug arrangements.

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## PART 1: GENERAL

1.1 SCOPE

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## PART 2: PRODUCTS AND INSTALLATION

2.1 WIRING DEVICES AND PLATES

A. Provide wiring devices as shown on the plans and identified by the appropriate symbols. Hubbell numbers are used to identify the particular type of devices required except where otherwise noted. Pass & Seymour, Leviton, Sierra, General Electric or approved equal switches and receptacles shall be provided. All switches and receptacles shall be U.L. listed and meet performance tests for specification grade devices.

B. All receptacles shall be approved self grounding type.

C. Switch, receptacle, and for all empty outlet boxes shall be raised galvanized steel.

D. All receptacle bodies and switch toggles shall be brown.

E. Receptacles:

Poles/ Wires	Volts	Amps	NEMA Configuration	Hubbell Cat. No.	Use	Remarks
2P-3W	125	20A	5-20R	5462	General	Duplex

F. Ground fault interrupter (GFI) receptacles shall be 15 ampere duplex, 120 volt, Pass & Seymour #1591 or 1591-F feed through receptacle as required.

G. Switches:

Poles	Amps.	Volts.	Hubbell Cat. No.	Remarks
Single	20 amp.	277 - A.C.	1221	Toggle - Quiet
Double	20 amp.	277 - A.C.	1222	Toggle - Quiet
Three Way	20 amp.	277 - A.C.	1223	Toggle - Quiet
Four Way	20 amp.	277 - A.C.	1224	Toggle - Quiet

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## PART 1: GENERAL

1.1 SCOPE

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B. Work under this section includes furnishing and installation of all fixtures complete with lamps where required as shown on the plans and on the fixture schedule. Capital letters adjacent to outlets indicate the fixture type and small letters indicate the manner of switching.

## PART 2: PRODUCTS AND INSTALLATION

2.1 LAMPS

A. All incandescent lamps shall be inside frosted, rated at 125 volts unless otherwise noted in the fixture listing. Lamps shall be standard 1000 hour life type.

B. Lamps shall be Sylvania, Westinghouse, General Electric or approved equal.

2.2 LIGHT FIXTURES

<u>Type</u>	<u>Description</u>	<u>Lamps</u>
A.	Porcelain keyless socket P & S #44.	1-150 watt A-21
	- - -	