

Scioto Park

Restroom Replacement

October 1, 2013

11:00 a.m.

Parks & Open Space

6555 Shier Rings Road

Dublin, Ohio 43016



project documents for: **Scioto Park Restroom Replacement**
7377 Riverside Drive
Dublin, OH 43016
M+A Project #2012-23

prepared for: **City of Dublin, Parks & Open Space**
6555 Shier Rings Road
Dublin, OH 43016

prepared by: **Meyers + Associates Architecture**
232 N. Third Street, Suite 300
Columbus, Ohio 43215

Bid Documents

Issue Date: September 17, 2013

SECTION 1
BIDDING REQUIREMENTS

INVITATION TO BID

Sealed proposals will be received from qualified bidders by:

**City of Dublin, Ohio
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016**

until **11:00 a.m.** local time on **Tuesday, October 1, 2013** at which time the sealed proposals will be opened by the **Director of Parks & Open Space**, for the following project:

SCIOTO PARK RESTROOM REPLACEMENT

For all materials and labor necessary for the construction of a public restroom facility including sewer and water service installation for the SCIOTO PARK RESTROOM REPLACEMENT.

Service delivery shall be in accordance with contract documents.

Bidders shall submit with their proposals a certified check, cashier's check, letter of credit, or a satisfactory bid bond in an amount equal to five percent (5%) of the estimated value of the contract.

ODOT Pre-qualification

NOT APPLICABLE X

Bidders are required to be pre-qualified with the Ohio Department of Transportation. Bidders must present a current approved copy of ODOT Pre-qualification at the time proposals are picked up from City Engineer's Office.

General Specifications

NOT APPLICABLE _____

The general specifications for the Project are the following (as all are in effect at time of awarding of the contract):

- 1). City of Dublin, Ohio Streets and Highways General Provisions
- 2). Sections 200 through 1000 of the *Construction and Material Specifications of the City of Columbus, Ohio*, and
- 3). Sections 200 through 700 of the *Construction and Material Specifications of the State of Ohio Department of Transportation*

Copies of the *Construction and Material Specifications of the City of Columbus, Ohio* may be obtained from:

Director of Public Service
City of Columbus, Ohio
90 W. Broad Street, 3rd Floor
Columbus, Ohio

Copies of the *Construction and Material Specifications of the State of Ohio Department of Transportation* may be obtained from:

Ohio Department of Transportation
Bureau of Contract Sales
P.O. Box 899
Columbus, Ohio 43216-0899

Contract Documents

The contract documents will be available for examination during regular business hours until the date of bid opening at:

**City of Dublin, Ohio
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016**

and

F.W. Dodge Office
1175 Dublin Road
Columbus, Ohio

For Transportation –related construction projects, contractors pre-qualified with the Ohio Department of Transportation may obtain copies of the contract documents for bidding purposes, and all other persons may obtain copies of the contract documents for informational purposes only. Copies of the contract documents may be obtained upon request accompanied by a non-refundable deposit in the amount of **\$40.00** for each set of contract documents. Checks shall be made payable to "City of Dublin, Ohio." The contract documents may be obtained from:

**City of Dublin, Ohio
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016**

For bids related to all other commodities, services, or projects, copies of the contract documents may be obtained upon request accompanied by a non-refundable deposit in the amount of **\$40.00** for each set of contract documents. Checks shall be made payable to "City of Dublin, Ohio." The contract documents may be obtained from:

**City of Dublin, Ohio
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016**

Prevailing Wages

APPLICABLE X NOT APPLICABLE _____

Bidders shall comply with Chapter 4115 of the Ohio Revised Code (Wages and Hours on Public Works). Bidders are responsible for verifying that the most current wage rates are utilized in

their bids. The successful bidder is also responsible for any changes in the prevailing wage rates or classifications throughout its performance of work on the Project.

Bids and Attached Documents

Bidders shall submit their bids on the form of proposal provided by the **Director of Parks & Open Space**

Each proposal shall be submitted in its entirety in a sealed envelope addressed to:

**Fred Hahn
Director of Parks & Open Space
City of Dublin, Ohio
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016**

Each sealed envelope containing a proposal shall be plainly marked on the outside as – “Bid for: **SCIOTO PARK RESTROOM REPLACEMENT.**” The envelope shall bear the name and address of the bidder.

If forwarded by mail, the sealed envelope containing the proposal must be enclosed in another envelope and the outside of the envelope must be addressed to and marked:

**Fred Hahn
Director of Parks & Open Space
City of Dublin, Ohio
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016**

BID FOR: SCIOTO PARK RESTROOM REPLACEMENT

Bidders shall submit the following with their proposals:

1. Non-collusion Affidavit.
2. Bid Guaranty.
3. List of Subcontractors if applicable.
4. Delinquent Personal Property Tax Affidavit.
5. Affidavit of Authority (if Bidder is a corporation).
7. Experience Record/References.
8. Power of Attorney (if Bidder is an out-of-state corporation).

The City of Dublin, Ohio reserves the right to reject any and all proposals and to waive any informalities or irregularities in the proposals.

Bidders may address inquiries to:

Christopher Meyers
Meyers + Associates Architecture
cmeyers@meyersarchitects.com
614-221.9433

By order of the City Council of the City of Dublin, Ohio.

CITY OF DUBLIN, OHIO

Marsha I. Grigsby

City Manager

INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

Immediately notify **Christopher Meyers** upon finding discrepancies or omissions in the bidding documents.

Direct inquiries and questions to **Christopher Meyers, Meyers + Associates Architecture at phone at 614-221-9433 or cmeyers@meyersarchitects.com**

1. Submit written request for clarification, correction or interpretation to the City not less than 7 days before the date for receipt of bids.
2. Modifications to the bidding documents will be issued as Addenda to the specifications and will become a part of the Contract.
3. No bidder shall rely on oral modifications or any other method of clarification, correction or interpretation of the bidding documents. Only modifications set forth in an Addendum will be binding.

PREVAILING WAGE DISKETTE

SECTION 2
BIDDING FORMS

PROPOSAL

SCIOTO PARK RESTROOM REPLACEMENT

_____ (the "Bidder") submits this Proposal having read and examined the contract documents, including but not limited to the Invitation to Bid; the City of Dublin, Ohio

All bids will be based upon elements indicated within the Drawings and Specifications. All changes to actual length, either additions or subtractions, will be through Change Order(s) using unit price(s) provided by contractor on proposal form.

Addenda Number

Date of Receipt

The Bidder proposes to provide the above named **SCIOTO PARK RESTROOM REPLACEMENT** in accordance with the contract documents for the following sum:

Total Base Bid (in figures): \$ _____

Total Base Bid (in words): \$ _____

Unless otherwise specified in the Bid Document the amount of the total bid is based on the unit prices or lump sum set forth in the Bid Schedule attached hereto and incorporated herein.

The Bidder understands and agrees that delivery under the Agreement for **SCIOTO PARK RESTROOM REPLACEMENT** shall be complete within **one hundred and twenty (120) consecutive calendar days**, or as specified in bid documents unless an extension of time is granted by the **Director of Parks & Open Space**.

Upon failure to have all work completed within the project time, the City of Dublin, Ohio shall be entitled to retain or recover from the Bidder, as liquidated damages, and not as a penalty, the amounts set forth in the following table for each and every calendar day until completion. The right of the City of Dublin, Ohio to recover liquidated damages shall not substitute for any recovery for additional costs in the event the Bidder fails to complete the Agreement for construction according to the contract documents.

Liquidated Damages:

<u>Contract Amount</u>	<u>Dollars Per Day</u>
\$0-25,000	\$ 100.00
25,001-50,000	150.00
50,001-100,000	200.00
100,001-500,000	300.00
500,001-1,000,000	500.00
1,000,001-2,000,000	750.00
2,000,001-5,000,000	1,000.00
5,000,001-10,000,000	1,500.00
Over \$10,000,001	2,000.00

REPRESENTATIONS OF THE BIDDER

The Bidder represents the following:

1. The Bidder has read and understands the contract documents and understands that it must comply with all requirements of the contract documents, regardless of whether the Bidder has actual knowledge of the requirements and regardless of any statement or omission made by the Bidder which might indicate a contrary intention.
2. The Proposal is based upon the items specified by the contract documents.
3. The Bidder has visited the site, become familiar with local conditions, and has correlated personal observations about the requirements of the contract

documents. The Bidder has no outstanding questions regarding the interpretation of the contract documents.

4. The Bidder has submitted the following in connection with this Proposal and the information contained therein is complete and accurate:
 - a. Non-collusion Affidavit.
 - b. Bid Guaranty.
 - c. List of Subcontractors.
 - d. Delinquent Personal Property Tax Affidavit.
 - e. Affidavit of Authority (if Bidder is a corporation).
 - g. Experience Record/References.
 - h. Power of Attorney (if Bidder is an out-of-state corporation).
6. The Bidder understands that the Agreement for **SCIOTO PARK RESTROOM REPLACEMENT** is subject to all of the provisions, duties, obligations, remedies and penalties of Ohio Revised Code Chapter.
7. Within ten (10) business days from the date of receipt the Notice of Intent to Award, the Bidder understands that it must enter into and execute an Agreement for **SCIOTO PARK RESTROOM REPLACEMENT** with the City of Dublin, Ohio if awarded on the basis of this Proposal. If the Bidder does not execute an Agreement for **SCIOTO PARK RESTROOM REPLACEMENT** for any reason, the Bidder and the Bidder's surety shall be liable to the City of Dublin, Ohio as provided in Ohio Revised Code Section 153.54(G).
8. Within ten (10) business days of the date of receipt of the Notice of Intent to Award, the Bidder understands that it must submit the following:
 - a. Performance Bond.
 - b. Certificate of Insurance and a copy of Additional Insured Endorsement.
9. The Bidder understands that it must furnish any other information requested by the **Fred Hahn, Director of Parks & Open Space**.

The Bidder hereby signs this Proposal on the ___ day of _____, 2013.

If Bidder is an individual, complete the following:

Signature: _____

Print Name: _____

Name of Business: _____
(if different than above)

Federal Identification Number: _____

Address: _____

Telephone: () _____

Fax: () _____

If Bidder is a partnership, complete the following:

Name of Partnership: _____

By: _____
(Signature)

Print Name: _____

Federal Identification Number: _____

Address: _____

Telephone: () _____

Fax: () _____

Names and Addresses of all general partners:

If Bidder is a joint venture, complete the following:

Name of Joint Venture: _____

By: _____
(Signature)

Print Name: _____

Address: _____

Telephone: () _____

Fax: () _____

Complete the following for each firm represented by the joint venture:

1. Name: _____

Federal Identification Number: _____

Address: _____

Telephone: () _____

Fax: () _____

2. Name: _____

Federal Identification Number: _____

Address: _____

Telephone: () _____

Fax: () _____

If Bidder is a corporation, complete the following:

Name of Corporation: _____

By: _____
(Signature)

Print Name: _____

Title: _____

Federal Identification Number: _____

Address: _____

Telephone: () _____

Fax: () _____

State of Incorporation: _____

Names and addresses of Corporate Officers:

If Bidder is an entity other than those described above, complete the following:

Name of Bidder:

By: _____
(Signature)

Print Name: _____

Title: _____

Federal Identification Number: _____

Address: _____

Telephone: () _____

Fax: () _____

Type of Business Entity: _____

Names and addresses of all Principals:

BID BOND

SCIOTO PARK RESTROOM REPLACEMENT

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned _____ (the
"Principal") and _____ (the
"Surety") are hereby held and firmly bound unto the City of Dublin, Ohio ("Dublin") as obligee in
the penal sum of the dollar amount of the bid submitted by the Principal to Dublin on
_____, **2013** to undertake the project known as:

SCIOTO PARK RESTROOM REPLACEMENT

The penal sum referred to herein shall be the dollar amount of the Principal's bid to Dublin, incorporating any additive or deductive alternate proposals made by the Principal on the date referred to above to Dublin, which are accepted by Dublin. In no case shall the penal sum exceed the amount of _____ dollars (\$ _____). (If the foregoing blank is not filled in, the penal sum will be the full amount of the Principal's bid, including alternates. Alternatively, if the blank is filled in, the amount stated must not be less than the full amount of the bid including alternates, in dollars and cents. A percentage is not acceptable.)

For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above-named Principal has submitted a bid for **SCIOTO PARK RESTROOM REPLACEMENT**.

NOW, THEREFORE, if Dublin accepts the bid of the Principal and the Principal fails to enter into a proper contract in accordance with the bid, plans, details, specifications, and bills of material; and in the event the Principal pays to Dublin the difference not to exceed five percent of the penalty hereof between the amount specified in the bid and such larger amount for which Dublin may in good faith contract with the next lowest bidder to perform the work covered by the bid, or in the event Dublin does not award the contract to the next lowest bidder and resubmits the project for bidding, the Principal will pay Dublin the difference not to exceed five percent of the penalty hereof between the amount specified in the bid, or the costs, in connection with the resubmission, of printing new contract documents, required advertising and printing and mailing notices to prospective bidders, whichever is less, then this obligation shall be null and void, otherwise to remain in full force and effect; if Dublin accepts the bid of the Principal and the Principal within ten days after the awarding of the contract, enters into a proper contract in accordance with the bid, plans, details specifications, and bills of material, which said contract is made a part of this bond the same as though set forth herein.

NOW ALSO, if the Principal shall well and faithfully do and perform the things agreed by Principal to be done and performed according to the terms of said contract; and shall pay all lawful claims of subcontractors, material men, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing of said contract; we

agreeing and assenting that this undertaking shall be for the benefit of any material man or laborer having a just claim, as well as for Dublin herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The Surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said contract or in or to the plans or specifications therefore shall in any wise affect the obligations of the Surety on the Surety's bond, and the Surety does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the plans or specifications.

Signed this _____ day of _____, 2013.

PRINCIPAL:

By: _____
(Signature)

Print Name: _____

Title: _____

Address:

Telephone: () _____

SURETY:

By: _____
(Signature)

Print Name: _____

Title: _____

Address:

Telephone: () _____

SURETY AGENT:

By: _____
(Signature)

Print Name: _____

Title: _____

Address:

Telephone: () _____

DELINQUENT PERSONAL PROPERTY TAX AFFIDAVIT

SCIOTO PARK RESTROOM REPLACEMENT

STATE OF _____
COUNTY OF _____, SS:

I, _____ (Affiant),
_____ (Title) of _____ (the "Bidder"),
after being cautioned and sworn, represent to the City of Dublin, Ohio, the following: (check the
appropriate statement)

At the time the Proposal was submitted, the Bidder was not charged with delinquent personal property taxes on the General Tax Lists of Personal Property of a county in which the City of Dublin, Ohio has territory (Franklin, Delaware, and Union Counties).

OR

At the time the Proposal was submitted, the Bidder was charged with delinquent personal property taxes on the General Tax Lists of Personal Property of a county in which the City of Dublin, Ohio has territory (Franklin, Delaware, and Union Counties) and that the amounts of such due and unpaid delinquent taxes, including due and unpaid penalties and interest, are set forth below:

<u>Taxes:</u>	<u>Penalties and Interest:</u>	<u>Counties:</u>
\$ _____	\$ _____	_____
\$ _____	\$ _____	_____
\$ _____	\$ _____	_____

(Signature of Affiant)

(Print Name)

Sworn to and subscribed before me this ____ day of _____ **2013.**

Notary Public

NONCOLLUSION AFFIDAVIT

SCIOTO PARK RESTROOM REPLACEMENT

STATE OF _____
COUNTY OF _____, SS:

I, _____ (Affiant),
_____ (Title) of _____ (the
"Bidder"), after being cautioned and sworn, represent to the City of Dublin, Ohio the following:

1. The bid price contained in the Bidder's Proposal for the Project has been arrived at independently without collusion, consultation, communication, or agreement for the purpose of restricting competition as to any matter relating to such bid price with any other bidder or third party.
2. Unless otherwise required by law, neither the bid price nor the Proposal has been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to the bid opening, directly or indirectly, to any other bidder or to any third party that would have any interest in the bid price.
3. No attempt has been made or will be made by the Bidder to induce any other individual, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition.

(Signature of Affiant)

(Print Name)

Sworn to and subscribed before me this ___ day of _____, 2013

Notary Public

AFFIDAVIT OF AUTHORITY

SCIOTO PARK RESTROOM REPLACEMENT

STATE OF _____
COUNTY OF _____, SS:

I, _____ (Affiant), after being cautioned and sworn, state the following:

1. I am the Secretary of _____ (the "Company"), a corporation organized and existing under the laws of the State of _____.
2. I am familiar with the records of the Company.
3. _____ (name of officer) is authorized to sign the Proposal and to execute a contract on behalf of the Company for the above-referenced project.

(Signature of Affiant)

(Print Name)

Sworn to and subscribed before me this _____ day of _____, **2013**

Notary Public

LIST OF SUBCONTRACTORS
Not Applicable _____

SCIOTO PARK RESTROOM REPLACEMENT

NOTE: The bidder must perform at least 50% of the total contract cost with its own forces.

Complete the following information for all subcontractors, which will be employed on the Project.

1. Name of Subcontractor: _____

Federal Identification Number: _____

Address: _____

Type of Work
Subcontractor to Provide: _____

Approximate Percentage of the Contract
Cost to be Performed by Subcontractor: _____

Experience Record: _____

2. Name of Subcontractor: _____

Federal Identification Number: _____

Address: _____

Type of Work
Subcontractor to Provide: _____

Approximate Percentage of the Contract
Cost to be performed by Subcontractor: _____

Experience Record: _____

3. Name of Subcontractor: _____

Federal Identification Number: _____

Address: _____

Type of Work
Subcontractor to Provide: _____

Approximate Percentage of the Contract
Cost to be performed by Subcontractor: _____

Experience Record: _____

4. Name of Subcontractor: _____

Federal Identification Number: _____

Address: _____

Type of Work
Subcontractor to Provide: _____

Approximate Percentage of the Contract
Cost to be performed by Subcontractor: _____

Experience Record: _____

5. Name of Subcontractor: _____

Federal Identification Number: _____

Address: _____

Type of Work
Subcontractor to Provide: _____

Approximate Percentage of the Contract
Cost to be performed by Subcontractor: _____

Experience Record: _____

EXPERIENCE RECORD/REFERENCES

SCIOTO PARK RESTROOM REPLACEMENT

NOTE: Bids from contractors inexperienced in this particular type of work will not be considered.

Complete the following information with respect to previous purchasers.

1. Name of Person to

Contact for Reference: _____

Address: _____

Phone: () _____

2. Name of Person to

Contact for Reference: _____

Address: _____

Phone: () _____

3. Name of Person to

Contact for Reference: _____

Address: _____

Phone: () _____

SECTION 3
CONTRACT FORMS

NOTICE OF INTENT TO AWARD
SCIOTO PARK RESTROOM REPLACEMENT

To: _____

You are hereby notified that the City of Dublin, Ohio has accepted the Proposal submitted by you on _____, **2013** in response to the Invitation to Bid for the above-referenced project.

Within ten (10) business days from the date of receipt of this Notice of Award, you are required to:

1. Execute an Agreement for Construction.
2. Submit a Performance Bond.
3. Submit a Certificate of Insurance and a copy of an Additional Insured Endorsement.
4. Submit an Affirmative Action Certificate of Compliance.

If you fail to execute the Agreement for construction or provide the required submittals within ten (10) business days from the date of receipt of this Notice of Intent to Award, you or your surety shall be liable to the City of Dublin, Ohio as provided in Ohio Revised Code Section 153.54(G) and the City of Dublin, Ohio may award the contract to the next lowest and best bidder.

You are required to prepare and submit a progress schedule prior to the pre-construction conference to be held on _____ **Not Applicable** _____

Return an acknowledged copy of this Notice of Intent to Award to:

Fred Hahn, Director of Parks & Open Space
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016

CITY OF DUBLIN, OHIO

Date: _____

By: _____

Fred Hahn
Director of Parks & Open Space

RECEIPT OF NOTICE OF INTENT TO AWARD

Receipt of this Notice of Intent to Award is hereby acknowledged this ____ day
of _____, **2013**.

Company Name: _____

Signature: _____

Print Name: _____

Title: _____

Contract No: _____

**STANDARD AGREEMENT
CITY OF DUBLIN, OHIO**

This Agreement is entered into this ____ day of _____, 20____, by and between the City of Dublin, Ohio (**DUBLIN**), the Owner, located at 5200 Emerald Parkway, Dublin, Ohio 43017, and the

SERVICE PROVIDER

For services in connection with:

All materials and labor necessary for the construction of a public restroom facility including sewer and water service installation.

FOR THE FOLLOWING:

SCIOTO PARK RESTROOM REPLACEMENT

The **ARCHITECT** of the Project is

**CHRISTOPHER MEYERS
MEYERS + ASSOCIATES ARCHITECTURE
232 N. THIRD STREET, SUITE 300
COLUMBUS, OH 43215**

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES. CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS EXECUTION, COMPLETION AND MODIFICATION.

CONTRACT DOCUMENTS

This Agreement is for performance of a portion of the Work for the Project identified above. All Work by Service Provider shall be performed in accordance with the Contract Documents. The Contract Documents comprise of and include this Agreement, General and Supplemental Conditions, Plans and Specifications, Project Manuals and all amendments thereto. These Contract Documents are hereby specifically incorporated herein as part of this Agreement and shall govern the Service Provider for his portion of the Work related to the Project.

Service Provider shall furnish all materials, supplies, equipment, and other items proper or necessary to perform and complete the Work, including specifically providing all supervision and labor required for the completion of the Work in accordance with the Contract Documents.

Service Provider agrees and acknowledges that it has evaluated and is satisfied with the conditions and limitations under which the Work is to be performed, including, without limitation (i) the location, condition, layout and nature of the Project site and surrounding areas; (ii) generally prevailing weather and climatic conditions; (iii) anticipated labor supply and costs; (iv) availability and cost of materials, tools and equipment; and (v) other similar issues. Service Provider further represents and warrants that it is familiar with the entire Scope of its Work and that the Contract Price includes all of its Work that is specifically included in the Contract Documents or which is reasonably inferable from the Contract Documents.

1.4

In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes, and ordinances, Service Provider shall (i) provide the better quality or greater quantity of Work or (ii) comply with the more stringent requirement.

CONTRACT PRICE

As full compensation for performance of the Agreement, Dublin agrees to pay Service Provider in current funds the Contract Price for the satisfactory performance of the Work, in the manner described below, subject to all applicable provisions of the Agreement (check appropriate box):

- the firm fixed price of _____ Dollars (\$ _____) subject to additions and deductions as provided for in the Contract Documents; and/or
- unit prices in accordance with the attached Schedule of Unit Prices and estimated quantities, which is incorporated herein by reference and identified as Schedule; and/or
- time and material rates and prices in accordance with the attached Schedule of Labor and Material Costs which is incorporated herein by reference and identified as Schedule

2.2

The firm fixed-price, unit prices and/or time and material rates and prices are hereinafter referred to as the "Contract Price."

SURETY BONDING

BONDS

Service Provider shall, if required, furnish to Dublin appropriate surety bonds to secure performance of the Work and to satisfy all Service Provider's payment obligations under the Agreement. The surety bond shall provide that the terms of the Agreement and Contract Documents are incorporated by reference therein. Any bond provided by Service Provider pursuant to this provision is hereby deemed to so incorporate the Contract Documents and it is understood that the surety is accepting each and every responsibility and obligation which Service Provider has assumed toward Dublin under this Agreement and the Contract Documents, including but not limited to liability for indemnity, attorneys' fees and delay damages.

Bond: Required Not Required

If a performance or payment bond, or both, are required of the Service Provider under this Agreement, then said bonds shall be in the full amount of the Contract Price, unless otherwise specified herein.

The cost of the bond, if required, is included in the Contract Price.

In the event Service Provider shall fail to provide the required bonds within seven days after date of signature of this Agreement by both Parties, Dublin after giving the Service Provider written notice and opportunity to cure this may terminate this Agreement and enter into a contract for the balance of the Work with another contractor. The Service Provider shall pay all Dublin's costs and expenses incurred by Dublin as a result of said termination.

PERFORMANCE OF WORK

TIME IS OF THE ESSENCE

It is expressly understood and agreed by and between the Parties that time is of the essence regarding completion of the Work by Service Provider. Service Provider shall undertake all activities necessary for the performance of its Work immediately upon receipt of a letter of intent or notification of the award of this Agreement and shall commence work hereunder so that the entire Project may be completed in accordance with the Project Schedule. Service Provider shall perform, coordinate and schedule its Work so as not to cause any delay or disruption to the Project Schedule, the work of other entities on this Project or the completion date of the Project.

Service Provider acknowledges and agrees that Dublin will incur additional costs, damages, liabilities, lost profits or losses related to loss of use if this Project is not completed in accordance with any milestone or interim dates/deadlines or the substantial or final completion dates on the Project Schedule. As a result, Service Provider shall be liable for and shall reimburse Dublin for any such additional costs, damages, liabilities, lost profits or losses related to loss of use for its failure to meet all milestone, interim, substantial or final completion dates in accordance with the Project Schedule.

RELATIONSHIP OF THE PARTIES

Service Provider accepts the relationship of trust and confidence established by this Agreement to exercise its skill and judgment to further Dublin's interests, and to perform the Work in an expeditious and economical manner consistent with Dublin's interests. Nothing in this Agreement shall be construed to constitute the relationship between Service Provider and Dublin as a partnership, association, or joint venture.

Service Provider shall perform its Work under the general direction of Dublin (and/or Dublin's representative, construction manager, architect, or other duly authorized individual/entity) and in accordance with this Agreement and as reasonably inferable from the Contract Documents as being necessary to produce the intended results as specified hereafter.

PROJECT SCHEDULE

Service Provider agrees to perform its work in accordance with the sequence and schedule for this Project, and with any updates thereto (referred to in this Agreement as the "Project Schedule"). By agreeing to perform its Work in accordance with the Project Schedule, Service Provider has included reasonable allowances for out of sequence work, and weather and unusual or unforeseen delays. If requested by Dublin, Service Provider shall participate and cooperate in the development of the Project Schedule and any revisions thereto.

Service Provider shall continuously monitor the Project Schedule so as to be fully familiar with the timing, phasing and sequence of operations of Service Provider's Work and the other work being performed on the Project. Service Provider shall coordinate its Work with all other work on the Project to avoid conflict or interference with such other work.

If Dublin determines that Service Provider's Work has failed to meet the Project Schedule or any update thereof, Service Provider shall within seventy-two (72) hours of its receipt of written notice from Dublin prepare and submit a recovery schedule relating to its activities. Service Provider agrees that it shall at its sole cost and expense take such measures as are necessary, including adding manpower and/or equipment and/or working overtime to accelerate its activities to conform to the Project Schedule or any update thereto. Should Service Provider fail to undertake such measures Dublin shall have the right to supplement Service Provider's forces and/or equipment and back-charge Service Provider for the costs so incurred, together with a markup of ten percent (10%) for overhead and profit.

PERFORMANCE

Service Provider shall use its best care, skill, and diligence in supervising, directing and

performing, the Work. Service Provider shall have sole responsibility for the performance of the Work, including the methods, techniques and means for completing all portions of the Work. Service Provider has the responsibility to ensure that all material suppliers and subcontractors adhere to the Contract Documents, and that they order materials in time, taking into account the current market regarding both pricing and delivery conditions.

EXTRAORDINARY MEASURES BY DUBLIN

If the performance of the Work, as of a milestone or interim date/deadline on the Project Schedule, has not progressed or reached the level of completion required by the Contract Documents, Dublin shall have the right to order Service Provider to take corrective measures necessary to expedite the progress of the Work, including, without limitation, (i) working additional shifts or overtime, (ii) supplying additional manpower, equipment, and facilities, and (iii) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. Dublin's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Project Schedule. Service Provider shall not be entitled to an adjustment in the Contract Price in connection with Extraordinary Measures required by Dublin.

INTERPRETATION OF AGREEMENT INCONSISTENCIES AND OMISSIONS

Should inconsistencies or omissions appear in the Contract Documents, it shall be the duty of Service Provider to so notify Dublin in writing within three (3) working days of Service Provider's discovery thereof. Upon receipt of said notice, Dublin shall instruct the Service Provider as to the measures to be taken and Service Provider shall comply with Dublin's instructions. If Service Provider performs work knowing it to be contrary to any applicable laws, statues, ordinances, building codes, rules or regulations without notice to Dublin and advance approval by appropriate authorities, then Service Provider shall assume full responsibility for such work and shall bear all associated costs, charges, fees and expenses necessarily incurred to remedy the situation.

LAW AND EFFECT

The performance of this Agreement and all of its terms and conditions shall be interpreted and governed by the laws of the State of Ohio, unless otherwise noted herein.

SEVERABILITY

The partial or complete invalidity of anyone or more provisions of this Agreement shall not affect the validity or continuing force and effect of any other provision.

ENTIRE AGREEMENT

This Agreement is solely for the benefit of the signatories hereto and represents the entire and integrated agreement between the Parties hereto and, unless specifically referenced herein, supersedes any prior negotiations, representations, or agreements, either written or oral.

DUBLIN'S OBLIGATIONS

FINANCING INFORMATION

Upon written request from Service Provider, Dublin agrees to furnish reasonable evidence that financial arrangements have been made or otherwise exist to fulfill Dublin's payment obligations under the Agreement.

PROJECT FEES

Except for permits and fees, which are the responsibility of Service Provider, Dublin agrees to secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

TIMELY COMMUNICATIONS

Dublin, with reasonable promptness, shall transmit all submittals, transmittals, and written approvals relating to the Work. Any other information or services relevant to service Provider's performance of the Work under Dublin's control shall be furnished by Dublin after receipt from Service Provider of a written request for such information or services.

SERVICE PROVIDER'S OBLIGATIONS

RESPONSIBILITIES

Service Provider shall furnish all of the labor, materials, equipment, and services, including, but not limited to, competent supervision, shop drawings, samples, tools, and equipment as may be necessary for the proper performance of the Work in accordance with and as reasonably inferable from the Contract Documents.

SUBCONTRACTING

Service Provider shall provide to Dublin written notice that it intends to subcontract any of the Work covered by the scope of the Contract Documents to a third party. Dublin shall have the right to approve any and all such subcontracts and Service Provider shall not allow any work to be performed by any subcontractor that has not been approved in writing by Dublin. Service Provider agrees that it shall not be entitled to any additional compensation in the event that Dublin does not approve a proposed subcontractor. Service Provider further agrees to incorporate the terms and conditions of this Agreement into every subcontract.

In the event that Service Provider has work performed by a subcontractor who has not been approved by Dublin, Dublin shall have the right to terminate this Agreement or supplement Service Provider's Work as necessary to have the same completed in accordance with the Contract Documents. Any and all costs incurred by Dublin as a result of such action shall be the responsibility of Service Provider and Dublin may back-charge Service Provider therefor.

SHOP DRAWINGS SAMPLES, PRODUCT DATA AND MANUFACTURERS' LITERATURE

To the extent applicable or required, Service Provider shall promptly submit to Dublin for approval all shop drawings, samples, product data, manufacturers' literature and similar submittals as required by the Contract Documents or as required herein. Service Provider shall prepare and deliver its submittals to Dublin in such time and sequence so as not to delay the Project. The approval of any Service Provider submittal shall not be deemed to authorize deviations, substitutions or changes in the requirements of the Contract Documents unless express written approval is obtained from Dublin authorizing such deviation, substitution or change.

COORDINATION AND COOPERATION

Service Provider shall:

- (a) cooperate with Dublin and all others whose work may interfere or interface with the Work;
- (b) before proceeding with the Work under this Agreement, accurately check all previous and surrounding work done by other entities, determine its correctness, specifically note and immediately advise Dublin of any interference or discrepancies with the Work. Failure of Service Provider to detect and report discrepancies shall relieve Dublin of any and all Service Provider claims to recover cost, expense or damage resulting there from; and
- (c) participate in the preparation of coordination drawings and work schedules involving the Work, to the extent required or requested by Dublin.

AUTHORIZED REPRESENTATIVE

Unless otherwise stated in writing by Dublin, Service Provider shall have a competent foreman, superintendent, or representative, satisfactory to Dublin, on the Project at all times with authority to act on behalf of Service Provider with respect to the work and for the purpose of receiving notices, orders and instructions. Service Provider shall identify the person or persons so authorized to act on its behalf, in writing, before commencing work on the Project. All decisions, agreements or representations made by Service Provider's designated representative for this Project, whether oral or written, shall be binding on Service Provider.

TESTS AND INSPECTIONS

Service Provider shall schedule all required tests, approvals and inspections of the Work or portions thereof at appropriate times so as not to delay the progress of the Work or the Project. Service Provider shall bear all expenses associated with tests, inspections and approvals required of the Service Provider by the Contract Documents, unless otherwise agreed to.

WORKMANSHIP

Every part of the Work shall be executed in accordance with the Contract Documents in a workmanlike and professional manner. All materials used in the Work shall be furnished in sufficient quantities to facilitate the proper and expeditious execution of the Work, and shall be new.

MATERIALS FURNISHED BY OTHERS

In the event the scope of the Work includes installation of materials or equipment furnished by others, it shall be the responsibility of Service Provider to examine those items, store and install the items, unless otherwise provided for in the Contract Documents, with such skill and care as to ensure a satisfactory and proper installation. Loss or damage due to acts of Service Provider shall be deducted from any amounts due or to become due Service Provider under this Agreement.

SUBSTITUTIONS

No substitutions shall be made in the Work unless permitted in the Contract Documents and then only upon the Service Provider first receiving all approvals required under the Contract Documents for substitutions.

WARRANTY

Service Provider warrants and guarantees that its Work conforms in all respects to the Contract Documents and that it is free from defects in material and/or workmanship. Service Provider hereby warrants and guarantees its work to be free of defects in material or workmanship for a period of one year from the date of substantial completion, or such longer period as may be required by the Contract Documents or provided by any manufacturer's warranty applicable thereto. Service Provider further agrees to furnish any special warranties required by the Contract Documents relating to its Work prior to and as a condition of final payment. Service Provider agrees to perform any remedial or corrective work necessary to satisfy its warranty obligations without cost to Dublin.

UNCOVERING/CORRECTION OF WORK

If directed in writing by Dublin, Service Provider must uncover any portion of the Work, which has been covered by the Service Provider in violation of the Contract Documents or contrary to a directive issued by Dublin. Upon receipt of a written directive from Dublin, Service Provider shall uncover such Work for Dublin's inspection and then

restore the uncovered Work to its original condition at the Service Provider's time and expense.

Dublin may direct Service Provider to uncover portions of the Work for inspection by Dublin at any time. Service Provider is required to uncover such Work whether or not Dublin had requested to inspect the Work prior to it being covered. This Agreement shall be adjusted by Change Order for the cost and time of uncovering and restoring any Work which is uncovered for inspection and proves to be installed in accordance with the Contract Documents, provided Dublin had not previously instructed the Service Provider to leave the Work uncovered. If Service Provider uncovers Work pursuant to a directive issued by Dublin, and such Work upon inspection does not comply with the Contract Documents, then Service Provider shall be responsible for all costs and time of uncovering, correcting and restoring the Work so as to make it conform to the Contract Documents.

Service Provider is required to correct in a timely fashion any Work rejected by Dublin for failing to comply with the Contract Documents whether observed prior to the commencement of the warranty period(s) or during the warranty period(s). Service Provider shall correct at its own cost and time and bear the expense of additional services for any nonconforming Work for which it is responsible.

CLEANUP

Service Provider shall at all times: (a) keep the Project and premises free from all rubbish and debris resulting from the Work; (b) broom clean each of its work areas prior to discontinuing work each day; and (c) clean up to the satisfaction of Dublin, including, but not limited to, dirt, grease, machine marks, etc., from walks, ceilings, floors, fixtures, etc. deposited or placed by or resulting from its Work.

If Service Provider fails to immediately commence compliance with cleanup duties within twenty-four (24) hours after written notification from Dublin of non-compliance, Dublin may implement appropriate cleanup measures without further notice and deduct the cost thereof from any amounts due or to become due to Service Provider under this Agreement.

SAFETY OF PERSONS AND PROPERTY

Service Provider is responsible for the health and safety of its employees, agents, subcontractors, and other persons on and adjacent to the Project site. Service Provider, however, shall take all necessary and prudent safety precautions with respect to its Work and shall comply with all safety programs and measures, and with all applicable laws, ordinances, rules, regulations and orders of any public authority for the safety of persons or property, including, but not limited to, OSHA. Service Provider shall also coordinate work activities with Dublin, other contractors or entities, or any other parties involved with this Project to reduce the risk of an accident or injury occurring.

Service Provider shall protect any of its Work and materials susceptible to damage from moisture or hosting of mold at all times. Service Provider agrees to indemnify, hold harmless and defend

Dublin from any and all claims, losses, costs and expenses (including, but not limited to, all attorneys' and consultants' fees) relating to or arising from mold resulting from Service Provider's Work.

INSURANCE

SERVICE PROVIDER'S INSURANCE

Prior to start of the Work, Service Provider shall procure and maintain in full force and effect Workers' Compensation Insurance, Employer's Liability Insurance, Comprehensive or Commercial General Liability Insurance on an occurrence basis, and any additional insurance required of Service Provider. Service Provider shall deliver all certificates of insurance to Dublin, or upon request, copies of the actual insurance policies. All liability insurance policies described above shall be written on a comprehensive form and shall conform to the laws of the State of Ohio. Before any of the Service Provider's employees perform any work on the Project, Service Provider shall furnish Dublin with the Insurance Company's certificate that such coverage has been provided and each certificate shall contain the required limits. Dublin shall be specifically named and included as an additional insured party under all coverage required by this Agreement and coverage for such additional insured shall also be amended to include a waiver of subrogation and primary and noncontributing endorsements in favor of the additional insured.

The types of insurance, and minimum amount of limits, required hereunder are:

- (A) Workers' Compensation Insurance coverage: statutory requirements in the State of Ohio.
- (B) Employers Liability Insurance with limits of not less than \$1,000,000 to anyone person: USL&H; FELA; Jones Act; and, Continental Shelf Act Endorsements, if applicable.
- (C) Commercial General Liability Insurance, written on an occurrence form:
 - Standard Limits
 - Excess Liability Policy, if applicable: \$____,000,000.
 - Professional Liability, if applicable, \$1,000,000 Each Occurrence, with not less than a Five Year Completed Operations period if claims-made coverage.
 - Other policies.

NUMBER OF POLICIES

Commercial General Liability insurance and other liability insurance may be arranged under a single policy for the full limits required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability Policy. The Umbrella Liability coverage must be as broad or broader than the Primary Insurance Policies.

PROPERTY INSURANCE

Service Provider is responsible to provide insurance coverage for tools, equipment or personal belongings that are owned or leased by the Service Provider or its employees at Service Provider's own expense. Service Provider accepts and shall bear the risk of loss for its property, material, or equipment, which is stored on-site and off-site.

SUBROGATION

Service Provider on behalf of itself, its insurers, successors and assigns does hereby waive any and all rights of subrogation against Dublin relating to or arising from any loss or damage which is within any insurance coverage of Service Provider, regardless of whether a claim has been submitted to or denied by the insurer.

INDEMNIFICATION AND DUTY TO DEFEND

Except to the extent expressly prohibited by statute, Service Provider agrees to fully indemnify and hold harmless Dublin and its elected officials, agents, officers, representatives, attorneys, employees, volunteers, indemnities, independent contractors and invitees from and against any and all claims, causes of action, amounts, damages, demands, expenses, judgments, liabilities, losses, obligations, proceedings and costs, including actual attorneys' fees, expert witness fees and costs incurred, that in whole or in part, arise out of, involve, result from, relate to or are alleged to have been caused by:

- (a) The performance of any aspect of the Work by Service Provider or any of its subcontractors, independent contractors, suppliers, manufacturers, materialmen or persons or entities for whose acts Service Provider is or may be liable and/or their respective agents and/or employees;
- (b) Act(s), failure(s) to act, omission(s) or negligence of or by Service Provider or any of its subcontractors, suppliers, manufacturers, materialmen or persons or entities for whose acts Service Provider is or may be liable and/or any of their respective agents and/or employees.
- (c) Injury or death to persons or damage to property which arises out of, involves, results from, relates to or is caused by, in whole or in part, any action(s), inaction(s) and/or negligence of or by Service Provider or any of its subcontractors, independent contractors, suppliers, manufacturers, materialmen or persons or entities for whose acts Service Provider is or may be liable and/or any of their respective agents and/or employees.
- (d) The failure of Service Provider to pay its subcontractors, suppliers, materialmen, laborers, union fringe benefits or any other obligation arising in the performance of the Work.

This indemnification provision shall not be construed to negate, abridge or reduce any other rights of Dublin and its elected officials, agents, officers, representatives, attorneys, employees, volunteers, indemnities, independent contractors and invitees.

In the event that any such claims, loss, cost, expense, liability, damage or other injury arise or are made or threatened against any indemnity hereunder, Dublin shall have the right to withhold any payments due or to become due to Service Provider an amount sufficient in its judgment and sole discretion to protect and indemnify in accordance with this provision against any and all such claims, loss, damage, cost and expense.

All indemnity obligations set forth in this Agreement shall survive the termination of this Agreement or the completion of Service Provider's Work.

CHANGES, CLAIMS AND DELAYS

CHANGES

Change to Agreement

Without invalidating this Agreement, Dublin may change, add to or reduce the Work to be performed hereunder. Any such change may be authorized as set forth herein.

Change Order

A Change Order is a document prepared by Dublin and signed by Service Provider stating their agreement upon the change in the scope of the Work, adjustment in the Contract Price and/or to the Project Schedule.

Adjustment in Contract Price

Service Provider shall not be entitled to receive compensation for extra work, materials or changes of any kind regardless of whether ordered by Dublin or Dublin's Representative, unless a written Change Order has been previously issued and signed by Dublin. If a change was ordered by Dublin or Dublin's Representative, and Service Provider performed but did not receive a written Change Order, Service Provider shall be deemed to have waived any claim for extra compensation, including anything related to schedule impacts or lost productivity, regardless of any written or verbal protests or claims by Service Provider. Dublin's issuance of a signed, written Change Order shall be deemed and construed as a condition precedent to Service Provider's filing of a valid claim for extra compensation as a result of Service Provider's performance of any work not originally included as part of the original scope of Work. If a Change Order requires an adjustment in the Contract Price, the adjustment shall be established by one of the following methods:

- (a) mutual agreement on a lump sum, which shall be supported by sufficient information submitted by Service Provider to substantiate the amount, including specifically a labor, material, equipment and Service Provider's cost breakdown;
- (b) unit prices already established in the Agreement or if not established by the Agreement then established by mutual agreement for the adjustment;
- (c) on a time and material basis or, if none, then as otherwise allowed by the Contract Documents, or, if none, as jointly acceptable.

(d) for overtime work, Service Provider shall only be entitled to recover the premium time differential without mark-up of any kind.

Agreement on any Change Order shall constitute a final settlement, and full accord and satisfaction, of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, the cumulative effect on the Project of all change orders issued to the date thereof, all direct and indirect costs, home office overhead and any and all adjustments to the Contract Price or Project Schedule.

CLAIMS

Claim

A claim is a demand or assertion made in writing by Dublin or Service Provider seeking an adjustment to the Contract Price and/or Project Schedule, an adjustment or interpretation of the Agreement's terms, or other relief arising under or relating to this Agreement, including the resolution of any matters in dispute between Dublin and Service Provider in connection with the Project.

Timing of Claims

Claims by Service Provider must be made within 21 days after occurrence of the event giving rise to such Claim. Claims must be initiated by written notice to Dublin and must be submitted through the "Statement of Claim" Form attached As Exhibit A to this Agreement. Any submitted "Statement of Claim" Forms must be complete, accurate and contain all information requested by the "Statement of Claim" Form. Failure by Service Provider to present written claims within 21 days of the event giving rise to the claim through the "Statement of Claim" shall constitute an express waiver of any rights to additional time, money or other relief.

Claim Documentation

All Claims presented or submitted by Service Provider shall include all supporting documentation and information to allow Dublin to evaluate the Claim. Dublin may request any additional documentation or information from Service Provider (whether maintained in any form or medium) to assist in assessing and evaluating Service Provider's Claim, and Service Provider agrees to provide the same.

Within ten (10) days of its receipt of a written request, Service Provider shall make available to Dublin or Dublin's Representative any books, records or other documents or information in its possession, custody or control relating to any Claim. Service Provider shall also require its subcontractors and suppliers, regardless of tier, to do likewise.

DELAYS/TIME IMPACT

Should Service Provider delay the progress of the Work so as to cause Dublin to suffer or become liable for any damages, Service Provider agrees to pay to Dublin the full amount of any and all such damages. Such damages, at Dublin's option, may be deducted from any payments due, or which become due, under the Agreement. Nothing in this paragraph shall limit Dublin's right to claim all actual damages sustained by it as a result

of Service Provider's delay. In addition, Dublin may terminate this Agreement for default as provided in Article 13 herein.

Dublin shall have the right, at any time, to delay or suspend the start or prosecution of the whole or any part of the Work under this Agreement, or to vary the sequence of performance thereof. Progress schedules may from time to time be modified to conform to contract completion requirements.

Dublin shall not be liable to Service Provider for delay to Service Provider's Work by reason of fire or other casualty; or on account of riots or of strikes, or other combined action of the workmen or other persons; or on account of any acts of God; or any other cause, whether foreseen or unforeseen, beyond Dublin's control.

All schedules incorporated into the Contract Documents or provided during the course of the performance of the Work are provided for the Service Provider's convenience. Dublin does not warrant or guarantee such Schedule(s) and Service Provider should not rely upon the sequence or duration of activities as set forth therein for any purpose, including the pricing of the Work. Service Provider specifically acknowledges that the sequence and duration of activities set forth in the Schedule(s) typically change on projects of this size, nature and complexity, and that they are likely to change on this Project. Dublin shall have the right to determine and, if necessary, change the time, order and priority in which the various portions of the Work is to be performed and all other matters relative to the timely and orderly conduct of the Work.

PAYMENT

GENERAL PROVISIONS

Schedule of Values

If the Agreement is not a unit price agreement, then the Service Provider shall prepare and submit to the Contractor prior to the due date for the submission of Service Provider's first application for payment, a Schedule of Values apportioned to the various divisions or phases of the Work. The Schedule of Values shall include line items for each portion of the Work. Each line item contained in the Schedule of Values shall be assigned an appropriate monetary price such that the total of all such items shall equal the Contract Price. The Schedule of Values shall be prepared in such detail as may be required by Dublin.

Payment Use and Verification

Service Provider is required to pay for all labor, materials, and equipment used in the performance of the Work. Reasonable evidence, satisfactory to Dublin, may be required to show that all obligations relating to Subcontract Work are current before releasing any payment due to Service Provider. If required by Dublin, before final payment is made for the Work, Service Provider shall submit evidence satisfactory to Dublin that all payrolls, bills for materials and equipment, and all known indebtedness connected with the Agreement and the Work, have been paid or otherwise satisfied.

Taxes

Service Provider agrees to withhold all municipal income taxes due or payable under the provisions of Chapter 181 of the Codified Ordinances of Dublin, Ohio, for wages, salaries and commissions paid to its employees and further agrees to require that all of its subcontractors shall also withhold any such municipal income taxes due under such chapter for any work completed or services performed related to this Project.

Payment Not Acceptance

Payment to Service Provider by Dublin does not constitute or imply acceptance of any portion of the Work.

PROGRESS PAYMENTS

Applications

Service Provider's Applications for Payment shall, unless otherwise required by Dublin or the Contract Documents, be submitted on the AIA 0702 form and shall be itemized and supported by the Service Provider's Schedule of Values, unit prices, and any other substantiating data as required by Dublin.

Partial Lien Waivers and Affidavits

Service Provider shall obtain from all of its subcontractors, vendors and suppliers, regardless of tier, a waiver of claim under the relevant mechanic's lien laws for the Project of all claim or lien rights for the amounts for which they have received payments with respect to the Project in the form attached hereto as Exhibit B to the Agreement.

Rejection of Service Provider's Payment Application

Dublin may reject a Service Provider's payment application or nullify a previously approved payment application, in whole or in part, as may reasonably be necessary to protect Dublin from loss or damage based upon:

- (a) Service Provider's repeated failure to perform the Work as required by the Contract Documents;
- (b) loss or damage arising out of or relating to the Contract Documents and caused by Service Provider to Dublin;
- (c) Service Provider's failure to properly pay for labor, materials, equipment or supplies furnished in connection with the Work;
- (d) rejected, nonconforming or defective Work, which has not been corrected in a timely fashion;
- (e) reasonable evidence of delay in performance of the Work such that the Work will not be completed in accordance with the Project Schedule, and that the unpaid balance of the Contract Price is not sufficient to offset the additional costs or damages that may be incurred by Dublin as a result of the anticipated delay caused by Service Provider;

- (f) reasonable evidence demonstrating that the unpaid balance of the Contract Price is insufficient to cover the cost to complete the Work; or
- (g) third party claims involving Service Provider or reasonable evidence demonstrating that third party claims are likely to be filed unless and until Service Provider furnishes Dublin with adequate security in the form of a surety bond, letter of credit or other collateral or commitment which are sufficient to discharge such claims if established.

Payment Amount

Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

1. The portion of the Contract Price properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Price allocated to that portion of the Work in the schedule of values, less retainage of ten percent (10%). Pending final determination of cost to Dublin of changes in the Work, amounts not in dispute shall be included and paid upon approval and payment by Dublin.
2. The progress payment amount shall be further modified under the following circumstance: (a) Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Price, less such amounts as Dublin shall determine for incomplete Work, retainage applicable to such Work and unsettled claims.
3. Dublin shall not make advance payments to Service Provider for materials or equipment, which have not been delivered and stored at the site unless the Contract Documents allow otherwise.

Time of Application

For each progress payment period, Service Provider shall submit its progress payment application to Dublin for the Work performed to date no later than the fifth day of each month, unless otherwise agreed.

Stored Materials and Equipment

To the extent permitted by the Contract Documents, applications for payment may include materials and equipment not incorporated into the Work. Approval of payment applications for materials and equipment stored on or off the site shall be conditioned on submission by Service Provider of bills of sale and applicable insurance or such other procedures satisfactory to Dublin to establish the proper valuation of the stored materials and equipment.

Time of Payment

Dublin shall make progress payments for all undisputed amounts to Service Provider for satisfactory performance of the Work no later than twenty (20) calendar days after receipt of Service Provider's complete payment application.

FINAL PAYMENT

Application

Service Provider may submit its final payment application to Dublin upon acceptance of the Work by Dublin, and upon Service Provider furnishing evidence of fulfillment of the Service Provider's obligations in accordance with the Agreement.

Requirements

When submitting its final payment application, Service Provider shall furnish the following to Dublin:

- (a) the Final Waiver of Lien form attached hereto as Exhibit C. Such form shall be in the amount of the application for final payment and be accompanied by the same Final Lien Waiver form executed by Service Provider's subcontractors, materialmen and suppliers;
- (b) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which Dublin might in any way be liable, have been paid or otherwise satisfied;
- (c) consent of Service Provider's surety to final payment, if applicable and required;
- (d) satisfaction of closeout procedures required by Dublin;
- (e) current certificates of insurance establishing that all insurance coverage required by the Agreement shall remain in effect through the final acceptance of the Project by Dublin, or such later date as may be required by the Contract Documents, and that such coverage will not be materially altered, expire or terminate without thirty (30) days prior certified mail notice thereof; and
- (f) other data if required by Dublin, such as receipts, releases, and waivers of liens effective upon payment. Acceptance of final payment by Service Provider shall constitute a waiver of any and all claims (whether known or unknown) by Service Provider except those previously made in writing and identified by Service Provider as unsettled at the time of final application for payment.

Time of Payment

Final payment of the undisputed balance due of the Contract Price shall be made to Service Provider within ten (10) calendar days after receipt of all information required under Section 12.3 of this Agreement.

DISPUTE RESOLUTION

INITIAL DISPUTE RESOLUTION

If a dispute arises out of, or relates to this Subcontract or the alleged breach thereof, the parties shall endeavor to settle the dispute first through direct discussions by and between the parties respective Project Managers or principals.

If the dispute cannot be settled through direct discussions, the parties shall then endeavor to settle the dispute by mediation in accordance with the Construction Industry Mediation Rules of the American Arbitration Association. Notice of demand for mediation shall be filed in writing with the other party to this Agreement with the American Arbitration Association. The demand for mediation shall be made within a reasonable time after written notice of the claim, dispute or other matter in question has been given, but in no event shall it be made when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statutes of limitation. The location of the proceedings shall be in Dublin, Ohio, unless the parties agree otherwise. The parties shall share all costs of the mediation equally.

ARBITRATION/LITIGATION

In the event that a dispute is not resolved as set forth above, Dublin shall have the right, in its sole and exclusive discretion, to elect whether the dispute will then be decided by arbitration or litigation. In the event that Dublin should elect to resolve the dispute through Arbitration it shall so notify Service Provider in writing. The parties will then meet or confer to reach agreement on an arbitrator. The arbitration shall be conducted in general conformity with the Construction Industry Rules of the American Arbitration Association, however, the American Arbitration Association shall not administer the arbitration. The locale of any arbitration hearing shall be Dublin, Ohio. Any award rendered in the arbitration shall be final and binding upon the parties and may be enforced in any court of competent jurisdiction.

In the event that Contractor should elect to resolve the dispute through litigation jurisdiction thereof shall reside exclusively with the Common Pleas court of Franklin County, Ohio.

PREVAILING PARTY

In the event of any arbitration, the prevailing party shall be awarded its share of the arbitration costs and arbitrator compensation. For the purpose of the application of this provision, the arbitrator(s) shall determine the prevailing party as follows: the prevailing party shall be that party who's last written settlement position (demand/offer) made before the commencement of the arbitration hearing(s) is closest to the final award rendered by the arbitrator(s). In order to be considered for the purpose of this provision, any settlement position (demand/offer) must be in writing and must have been delivered by certified mail to the other party. It is the intent of this provision for the arbitrator(s) to identify the true party prevailing in any arbitration proceeding. To that end, in the event that a party seeking relief has not taken a settlement position, i.e. the claimant, the

arbitrator(s) shall consider the settlement demand to be the full relief requested in the arbitration demand. In the event that the respondent has not taken a settlement position,

the arbitrator(s) shall consider the offer to be a complete rejection of the relief requested by the claimant. Where there are mixed claims and counterclaims, the determination of the prevailing party shall be within the discretion of the arbitrator(s) consistent with the intent of this provision."

WORK CONTINUATION AND PAYMENT

Service Provider shall carry on the Work and maintain the Project Schedule pending final resolution of a Claim including mediation, arbitration or litigation, unless the Agreement has been terminated or the Work suspended as provided for in the Agreement, or the parties otherwise agree in writing to a partial or total suspension of the Work. If Service Provider is continuing to perform in accordance with the Agreement, Dublin shall continue to make undisputed payments as required by the Agreement.

RECOURSE BY DUBLIN FAILURE OF PERFORMANCE

Notice to Cure

If Service Provider refuses or fails to supply enough properly skilled workers, proper materials, or maintain the Project Schedule, or it fails to make prompt payment to its workers, subcontractors or suppliers, disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a breach of a provision of this Agreement, Service Provider may be deemed in default of this Agreement. If Service Provider fails within three (3) working days after written notification to commence and continue satisfactory correction of such default, with diligence and promptness, then Dublin without prejudice to any other rights or remedies, shall have the right to any or all of the following remedies:

- (a) supply such number of workers and quantity of materials, equipment and other facilities as Dublin deems necessary for the satisfactory correction of such default, which Service Provider has failed to complete or perform after the aforesaid notice, and charge the cost thereof to Service Provider, who shall be liable for the payment of same including reasonable overhead and profit;
- (b) contract with one or more additional contractors, to perform such part of the Work, as Dublin shall determine will provide the most expeditious correction of the default and charge the cost thereof to Service Provider;
- (c) without further notice to Service Provider, withhold payment of monies due the Service Provider in accordance with this Agreement; and
- (d) in the event of an emergency affecting the safety of persons or property (as determined in Dublin's sole discretion), Dublin may correct such default, without first giving three (3) working days' written notice to Service Provider, but shall

give prompt written notice of such action to Service Provider, and charge the cost thereof to the Service Provider.

Service Provider agrees to indemnify and hold Dublin harmless from and against any and all damage, loss, cost or expense, including the actual attorneys' fees incurred, arising from or relating to the default of Service Provider, regardless of whether Service Provider cures the default or is ultimately determined not to have been in default of its obligations under this Agreement, in which event the termination shall be deemed to have been a termination for Dublin's convenience.

Termination by Dublin

Termination for Default/Cause

If Service Provider fails to commence and satisfactorily continue correction of a default within three (3) working days after written notification from Dublin, then the Agreement may be terminated and Dublin may use any materials, implements, equipment, appliances or tools furnished by or belonging to Service Provider to complete the Work. Dublin shall issue a written notice of termination to Service Provider at the time the Agreement is terminated.

Dublin may also furnish those materials, equipment, and/or employ such workers or subcontractors, as Dublin deems necessary to maintain the orderly progress of the Work. Service Provider hereby consents to the assignment of its subcontracts or agreements which Dublin, in its sole discretion, deems necessary for the orderly progress of the Work, immediately upon the issuance of a determination of default.

All costs incurred by Dublin in performing the Work, shall be deducted from any monies due or to become due Service Provider under this Agreement. Service Provider shall be liable for the payment of any amount by which such expense may exceed the unpaid balance of the Contract Price.

Termination for Convenience

Dublin shall have the right to terminate this Agreement for its convenience by providing Service Provider with written notice thereof. Upon Service Provider's receipt of such notification it shall immediately cease work on the Project and take all steps reasonably available to minimize the cost of termination. In the event of such termination, Service Provider shall be entitled to receive as full and complete compensation the value of Work that is properly completed up to the date of termination as identified on the schedule of values, the cost of any stored material not previously paid for or incorporated in the Work which can not be returned or restocked, and reasonable direct costs of demobilization. Service Provider shall not be entitled to compensation for any field or home office overhead or any profit on work not performed.

In the event that any court or arbitration panel should determine that a termination of Service Provider by Contractor for cause was a breach of the Agreement, any such termination shall immediately be converted to a termination for convenience and Service Provider's damages shall be so calculated.

Use of Service Provider's Equipment

If Dublin performs work under this Article, or subcontracts such work to be so performed, Dublin and/or the persons to whom work has been subcontracted shall have the right to take and use any materials, implements, equipment, appliances or tools furnished by, belonging or delivered to Service Provider and located at the Project for the purpose of completing any remaining Work. Immediately upon completion of the Work, any remaining materials, implements, equipment, appliances or tools not consumed or incorporated in performance of the Work, and furnished by, belonging to, or delivered to the Project by or on behalf of Service Provider, shall be returned to Service Provider in substantially the same condition as when they were taken, normal wear and tear excepted.

BANKRUPTCY

Termination Absent Cure

Should there be filed by or against Service Provider a petition in bankruptcy, or for a reorganization, or should Service Provider become insolvent or be adjudicated as bankrupt or go into receivership, liquidation or dissolution, either voluntarily, involuntarily or under court order, or make a general assignment for the benefit of creditors, or otherwise acknowledge insolvency, then in any such event, each of which shall constitute a default hereunder on the Service Provider's part, Dublin shall have the right, in addition to any other rights and remedies provided by this Agreement, the Contract Documents or by law, to proceed in accordance with the provisions of Article 14 of this Agreement.

Interim Remedies

If Service Provider is not performing in accordance with the Project Schedule at the time a petition of bankruptcy is filed, or at any subsequent time, Dublin may avail itself of such remedies under this Article as are reasonably necessary to maintain the Project Schedule.

EQUAL OPPORTUNITY EMPLOYMENT

Service Provider shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, age or national origin. Service Provider shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, age 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. Service Provider agrees to post in conspicuous places, available to employees and applicants for employment, notices, which may be provided by Dublin setting forth the provisions of this equal opportunity pledge and commitment.

Service Provider shall comply with all provisions of the DPW Regulation on EEO, and the implementing rules, regulations and applicable orders of the State Equal Employment Opportunity Coordinator.

DUBLIN/OWNER:

SERVICE PROVIDER:

CITY OF DUBLIN, OHIO

By: _____

By: _____

Its: _____

Its: _____

Date: _____

Date: _____

APPROVED AS TO FORM:

Law Director

Date: _____

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned (the "Principal") and _____ (the "Surety"), are hereby held and firmly bound unto the City of Dublin, Ohio ("Dublin") in an amount not to exceed one hundred percent (100%) of the agreed contract amount for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION is such, that whereas the Principal did on this ____ day of _____, 20 __, enter into a contract with Dublin which said contract is made a part of this bond the same as though set forth herein;

NOW, if the Principal shall well and faithfully do and perform the things agreed by the Principal to be done and performed according to the terms of said contract; and shall pay all lawful claims of subcontractors, material men and laborers, for labor performed and materials furnished in the carrying forward, performing or completing of said contract; we agreeing and assenting that this undertaking shall be for the benefit of any material man or laborer having a just claim, as well as for Dublin; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety of any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The Surety for value received, hereby stipulates and agrees that no modifications, omissions, or additions in or to the terms of the contract or to the work to be performed there under or in or to the plans or specifications therefore shall in any wise affect the Surety's obligations on this bond.

Signed this ____ day of _____, 20__.

PRINCIPAL: _____

By: _____

(Signature)

Print Name: _____

Title: _____

Address: _____

Telephone: () _____

SURETY: _____

By: _____
(*Signature*)

Print Name: _____

Title: _____

Address: _____

Telephone: () _____

SURETY AGENT: _____

By: _____
(*Signature*)

Print Name: _____

Title: _____

Address: _____

Telephone: () _____

CERTIFICATION OF FUNDS

SCIOTO PARK RESTROOM REPLACEMENT

I, Angel Mumma, Director of Finance/Deputy City Manager of the City of Dublin, Ohio, certify that:

1. The Council of the City of Dublin, Ohio has appropriated \$_____ for the above-referenced project by Resolution No. _____ adopted on _____, 20__.
2. The amount so appropriated is on deposit or in the process of collection to the credit of the appropriate fund free from any outstanding obligations.

CITY OF DUBLIN, OHIO

Date: _____

By: _____

Angel Mumma
Director of Finance/Deputy City Manager

**NOTICE TO PROCEED
Not Applicable ____**

SCIOTO PARK RESTROOM REPLACEMENT

To: _____

You are hereby notified to commence work within ten (10) business days from the date of receipt of this Notice to Proceed. You are required to complete the work within **one hundred and twenty (120) consecutive calendar days**.

Return an acknowledged copy of this Notice to Proceed to:

**Fred Hahn, Director of Parks & Open Space
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016**

CITY OF DUBLIN, OHIO

Date: _____

By: _____
**Fred Hahn
Director of Parks & Open Space**

RECEIPT OF NOTICE TO PROCEED

Receipt of this Notice to Proceed is hereby acknowledged this ____ day of _____, 2013.

Company Name: _____

Signature: _____

Print Name: _____

Title: _____

NOTICE OF COMMENCEMENT OF PUBLIC IMPROVEMENT

Not Applicable ____

Section 1311.252, Ohio Revised Code

Notice is hereby given of the commencement of a public improvement as follows:

- 1. The public improvement is identified as:

Project Name: **SCIOTO PARK RESTROOM REPLACEMENT**
Project Number: **GR1202**
Location: **DUBLIN, OHIO**

- 2. The public authority responsible for the public improvement is:

City of Dublin, Ohio
5200 Emerald Parkway
Dublin, Ohio 43017

- 3. The principal contractor and its surety on the public improvement are as follows:

Principal Contractor:_____	Surety:_____
Name_____	Name_____
Address_____	Address_____
City, State_____	City, State_____
Zip Code_____	Zip Code_____
Telephone Number_____	Telephone Number_____

- 4. The City of Dublin, Ohio first executed a contract with a principal contractor for the public improvement on _____ 2013.

5. The name and address of the representative of the City of Dublin, Ohio upon whom service may be made for the purposes of serving an affidavit pursuant to Section 1311.26 of the Ohio Revised Code is:

**Fred Hahn, Director of Parks & Open Space
Parks & Open Space
6555 Shier Rings Road
Dublin, Ohio 43016**

CITY OF DUBLIN, OHIO

By: _____
**Fred Hahn
Director of Parks & Open Space**

Sworn to and subscribed before me this _____ day of _____, 2013.

Notary Public

CHANGE ORDER

SCIOTO PARK RESTROOM REPLACEMENT

Change Order No. _____ Contractor Name: _____

Date: _____

Agreement Date: _____

The following changes are made to the contract documents:

The changes are made for the following reasons:

Change to contract price:

Original contract amount: \$ _____

Current contract amount
adjusted by previous
Change Orders: \$ _____

The contract will be (circle one:
increased/decreased) due to this
Change Order by: \$ _____

New contract amount (including
this Change Order): \$ _____

Change to contract time:

The contract time will be (circle one: increased/decreased) due to this Change Order by _____ calendar days.

The date for completion of all work will be _____, **2013**.

This Change Order is signed this _____ day of _____, **2013**.

CONTRACTOR

CITY OF DUBLIN, OHIO

By: _____
Marsha I. Grigsby
City Manager

By: _____
(signature)

Print Name: _____

By: _____
Fred Hahn
Director of Parks & Open Space

Title: _____

By: _____
Angel Mumma
Deputy City Manager/
Director of Finance

CITY OF DUBLIN, OHIO
PUBLIC IMPROVEMENTS GENERAL PROVISIONS

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**CITY OF DUBLIN, OHIO
STREETS AND HIGHWAYS
GENERAL PROVISIONS**

1010 - DEFINITIONS AND TERMS

Whenever in these general provisions or in other contract documents the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

101.01 Abbreviations. Whenever the following abbreviations are used in these general provisions or in any other contract documents, they are to be construed the same as the respective expressions represented:

AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
AREA	American Railway Engineering Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWS	American Welding Society
AWWA	American Water Works Association
CMSC	Construction and Material Specifications - City of Columbus
EEI	Edison Electric Institute
FHWA	Federal Highway Administration, Department of Transportation
FSS	Federal Specifications and Standards, General Services Administration
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IMSA	International Municipal Signal Association
IPCEA	Insulated Power Cable Engineering Association
ITE	Institute of Transportation Engineers
NEMA	National Electrical Manufacturers Association
ODOTCMS	Ohio Department of Transportation Construction and Material Specifications
OMUTCD	Ohio Manual of Uniform Traffic Control Devices
OSHA	Occupation Safety & Health Act
SSPC	Steel Structures Painting Council
UL	Underwriters' Laboratories, Inc.

Unless otherwise stated in special provisions or in a drawing note, the latest revision of the above standards shall apply.

References made to dated Specifications shall govern, unless the Engineer approves later revisions.

101.02 Advertisement. The public announcement, as required by law, inviting bids for work to be performed or materials and equipment to be furnished.

101.03 Award. The written acceptance by the City Manager of a bid.

101.04 Bidder. Any individual, firm, partnership, or corporation submitting a bid for the advertised work, acting directly or through a duly authorized representative.

101.05 Borrow Area. The term borrow area as used in this section refers to locations outside the right-of-way from which natural materials are removed for use in the work.

101.06 Bridge. A structure, including supports, erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads and having a length measured along the center of roadway of more than twenty feet between the center line of bearing of abutments or extreme limits of openings for multiple boxes.

101.07 Calendar Day or Day. Every day shown on the calendar.

101.08 Certified Test Data. A test report from an independent laboratory listing test data for the specified requirements for the samples tested and a statement furnished by the Contractor by a person having legal authority to act for the supplier and/or manufacturer of the material that the test report furnished represents the material delivered to the project. The certification shall include the laboratory report number and the number of the project to which the material is delivered. Laboratory reports signed by a registered professional engineer and those signed by other personnel and notarized will be accepted for this purpose.

101.09 Change Order. A written order issued by the Director of Parks & Open Space to the Contractor, covering changes in the plans or quantities or both, within or beyond the scope of the contract and establishing the basis of payment and time adjustments for the work affected by the changes.

101.10 City. The City of Dublin, Ohio, acting through its Director of Parks & Open Space or properly authorized agents thereof; such agents acting severally within the scope of the particular duties entrusted to them.

101.11 Completion. Completion of the project shall occur when all of the following items are completed in compliance with the contract: (1) the work has been satisfactorily completed in all respects; (2) the project is ready for use by the City; and (3) the Contractor has satisfactorily executed and delivered to the Director of Parks & Open Space all documents, certificates and proofs of compliance.

101.12 Completion Date. The date, as shown in the proposal, on which the work contemplated shall be completed unless extended by an approved written extension.

101.13 Conduit. Any pipe or similar passageway for electricity, gas, water or other utility.

101.14 Contract. The agreement between the City and the Contractor as set forth in the contract documents setting forth the obligations of the parties thereunder, including but not limited to, the performance of the work, the furnishing of labor and materials, and the basis of payment.

101.15 Contract Documents. The contract documents include the invitation to bid; proposals; affidavits; contract forms and contract bond; General Provisions at the time of the award of the contract; supplemental specifications; special provisions; general and detailed plans; notices to the Contractor; and any change orders and supplemental agreements that are required to complete the construction of the work in an acceptable manner, including authorized extensions of the completion date, all of which constitute one instrument.

101.16 Contract Bond. The approved form of security, executed by the Contractor and the Contractor's surety or sureties, guaranteeing complete performance of the contract and all supplemental agreements pertaining thereto and the payment of all legal debts pertaining to the construction of the project.

101.17 Contract Item (Pay Item). A specifically described unit of work for which a price is provided in the contract.

101.18 Contractor. The individual, firm, partnership, corporation, or other entity contracting with the City for performance of prescribed work, acting directly or through a duly authorized representative.

101.19 County. The county in which the work is to be performed.

101.20 Culvert. Any structure not classified as a bridge, which provides an opening under the roadway.

101.21 Department or Division. All references to "Department," or "Division," or any particular department or division of the City of Dublin, Ohio or any particular department or division of the State of Ohio shall refer to the Parks and Recreation, Parks & Open Space of the City of Dublin, Ohio.

101.22 Director. All references to Director shall refer to the Director of Parks & Open Space.

101.23 Director of Parks & Open Space. The Director of Parks & Open Space of the City of Dublin, Ohio or the Director of Parks & Open Space designated representative.

101.24 Equipment. All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and also tools and apparatus necessary for the proper construction and acceptable completion of the work

101.25 Extra Work. An item of work not provided for in the contract as awarded but found essential to the satisfactory completion of the contract within its intended scope.

101.26 Extra Work Contract. A contract concerning the performance of work or furnishing of materials involving extra work. Such extra work may be performed at agreed prices or on a force account basis.

101.27 Fabricator. The individual, firm, or corporation that fabricates structural metals or prestressed concrete members as an agent of the Contractor.

101.28 Inspector. The Director of Parks & Open Space's authorized representative assigned to make detailed inspections of contract performance.

101.29 Invitation to Bid. The invitation for proposals for all work or materials on which bids are required. Such Invitation to Bid will indicate with reasonable accuracy the quantity and location of the work to be done or the character and quality of the material and/or equipment to be furnished and the time and place of the opening of proposals.

101.30 Laboratory. A reputable testing laboratory that is designated by or acceptable to the Director of Parks & Open Space for rendering testing and inspection services on a contract where these specifications govern.

101.31 Materials. Any materials specified for use in the construction of the project and its appurtenances.

101.32 National Holidays. New Years Day, January 1; Martin Luther King's Birthday - the third Monday in January; Presidents' Day, the third Monday in February; Memorial Day, the last Monday in May; Independence Day, July 4; Labor Day, the first Monday in September; Thanksgiving Day, the fourth Thursday in November; Christmas Day, December 25.

101.33 Notice to Proceed. Written notice by the Director of Parks & Open Space to the Contractor, authorizing the beginning of work.

101.34 Owner. The City of Dublin, Ohio.

101.35 Plans. The plans, profiles, typical cross-sections, working drawings and supplemental drawings, approved by the Director of Parks & Open Space, or exact reproductions thereof, which show the location, character, dimensions and details of the work.

101.36 Profile Grade. The trace of a vertical plane along the centerline of roadway, or as indicated on the plans. Profile grade means either elevation or gradient of such trace according to the context.

101.37 Project. The specific section of the work together with all appurtenances and construction to be performed thereon under the contract.

101.38 Proposal. The offer of a bidder, on the prescribed form properly signed and guaranteed, to perform the work and to furnish the labor and materials at the prices quoted.

101.39 Proposal Form. The approved form on which the City requires bids to be prepared and submitted for the work.

101.40 Proposal Guaranty. The security furnished with a bid to guarantee that the bidder will enter into the contract if the bid is accepted.

101.41 right-of-way. A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to the project.

101.42 Road. A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

101.43 Roadbed. The graded portion of a highway within top and side slopes, prepared as a foundation for the pavement structure and shoulder.

101.44 Roadside. A general term denoting the area adjoining the outer edge of the roadway. Extensive areas between the roadways of a divided highway may also be considered roadside.

101.45 Roadside Development. Those items necessary to the complete highway which provide for the preservation of landscape materials and features; the rehabilitation and protection against erosion of all areas disturbed by construction through seeding, sodding, mulching and the placing of other ground covers; such suitable planting and other improvements as may increase the effectiveness and enhance the appearance of the highway.

101.46 Roadway. The portion of a highway or street within limits of construction.

101.47 Sewer. Pipe or conduit intended for carrying storm drainage or sanitary drainage.

101.48 Shoulder. The portion of the roadway contiguous to the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

101.49 Sidewalk. The facility within the public right-of-way primarily constructed for the use of pedestrians.

101.50 Special Provisions. Additions and revisions to the standard and supplemental specifications covering conditions peculiar to an individual project.

101.51 Specifications. The directions, provisions and requirements contained in General Provisions; all as supplemented by the supplemental specifications and special provisions.

101.52 State. The State of Ohio acting through its authorized representative.

101.53 Street. A general term denoting a public way for purposes of vehicular travel, including all improvements within the right-of-way such as sidewalks, bikepaths, sewers, and streetlights.

101.54 Structures. Bridges, culverts, catch basins, curb inlets, drop inlets, retaining walls, cribbing, manholes, end walls, buildings, curbs, pavements, sewers, water mains, service pipes, under drains, foundation drains and other features which may be encountered in the work and not otherwise classed herein.

101.55 Subcontractor. An individual, firm, partnership, corporation or other entity to whom the Contractor sublets part of the contract with the written approval of the Director of Parks & Open Space.

101.56 Subgrade. The surface upon which a structure or work and appurtenances are to be constructed.

101.57 Substructure. All of that part of a bridge or culvert below the bearings of simple and continuous spans, skewbacks of arches and tops of footings of rigid frames, together with back walls and wings.

101.58 Superintendent. The Contractor's authorized representative in responsible charge of the work.

101.59 Superstructure. The entire structure except the substructure.

101.60 Supplemental Specifications. Detailed specifications supplemental to or superseding these General Provisions or any other provisions.

101.61 Surety. The corporation, partnership or individual, other than the Contractor, executing a bond furnished by the Contractor.

101.62 Titles (or Headings). The titles or headings of the sections and subsections herein are intended for convenience of reference and shall not be considered as having any bearing on their interpretation.

101.63 Water line. Conduit for carrying public water supply.

101.64 Work. The furnishing of all labor, services, materials, equipment, and other incidentals necessary or convenient to the successful completion of the project and the carrying out of all duties and obligations imposed by the contract.

101.65 Work Days. Wherever indicated in these specifications, work days are defined as: Monday, Tuesday, Wednesday Thursday, Friday, and Saturday, excluding national holidays.

101.66 Working Drawings. Stress sheets, shop drawings, erection plans, false work plans, cofferdam plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data which the Contractor is required to submit for approval.

101.67 Interpretations. In order to avoid cumbersome and confusing repetition of expressions in these specifications, it is provided that whenever anything is, or is to be, done, if, as, or when, or where contemplated, required, determined, directed, specified authorized, ordered, given, designated, indicated, considered necessary, deemed necessary, permitted, reserved, suspended, established, approval, approved, disapproved, acceptable, unacceptable, suitable, accepted, satisfactory, unsatisfactory, sufficient, insufficient, rejected, or condemned, it shall be understood as if the expression were followed "by the Director of Parks & Open Space" or "to the Director of Parks & Open Space".

1020 - BIDDING REQUIREMENTS AND CONDITIONS

102. 01	Pre-qualification of Bidders
102. 02	Availability of Contract Documents
102. 03	Proposals
102. 04	Interpretation of Quantities in Proposal
102. 05	Examination of Plans, Specifications, Special Provisions, and Site of Work
102. 06	Preparation of Proposal
102. 07	Irregular Proposals
102. 08	Proposal Guaranty
102. 09	Delivery of Proposals
102. 10	Withdrawal of Proposals
102. 11	Public Opening of Proposals
102. 12	Statement of Materials
102. 13	Combination or Conditional Proposals

102.01 Pre-qualification of Bidders. Not applicable to this contract.

102.02 Availability of Contract Documents. The contract documents are available to prospective bidders at the locations stated in the Invitation to Bid. The prospective bidder will be required to pay the City the sum stated in the Invitation to Bid for each set of the contract documents.

102.03 Proposals. The City reserves the right to disqualify or refuse to consider a proposal if a bidder is in default for any of the following reasons:

- (a) More than one proposal for the same work from an individual, partnership, joint venture, corporation or other entity under the same or different name, or corporation under the same name or corporations with one or more of the same persons as officers of such corporations, or corporations who are holding companies, parent companies or holding companies which are subsidiaries of such corporations.
- (b) Evidence of collusion among bidders. Participants in such collusion will receive no recognition as bidders for any future work of the City for a period of three years.
- (c) Bid prices which obviously are unbalanced.

- (d) Lack of competency and/or adequate machinery, plant and other equipment.
- (e) Uncompleted work, whether or not with the City, which, in the judgment of the City, might hinder or prevent the prompt completion of additional work if awarded.
- (f) Failure to comply with the Pre-qualification requirement of 102. 01.
- (g) Failure to perform previous contracts adequately or a breach of prior contracts, whether or not the breach was waived by the City at a prior time.
- (h) Any other reasonable cause.

102.04 Interpretation of Quantities in Proposal. Not applicable to this contract.

102.05 Examination of Plans, Specifications, Special Provisions, and Site of Work. The bidder is expected to examine carefully the site of the proposed work and the contract documents before submitting a proposal. The bidder may also make additional investigations of subsurface conditions prior to submitting the bid. Such soil tests and investigations shall be at the bidder's expense and at no cost to the City. Any physical variation at the site of the work from that indicated by the contract documents, noted by the Contractor during the required examination or during any additional investigation conducted by the bidder, shall be called to the attention of the Director of Parks & Open Space prior to submitting a proposal. The submission of a proposal shall be considered evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the contract documents.

No pleas of ignorance of any provisions of the contract documents or of available subsurface data which may have been obtained by the City or its authorized representatives for use in designing the project shall not be accepted as a basis for any claim for extra compensation, extra work or for any extension of time.

Data concerning subsurface materials or conditions may have been obtained by the City for use in designing the project. Said borings, test excavations, and other subsurface investigations even if incorporated into the plans, if any, are incomplete, are not a part of the contract documents, and are not warranted to show the actual subsurface conditions. Said subsurface data, if not in the plans, is available for review by bidders upon written request and execution of a release for subsurface information. Bidders shall not rely on subsurface information obtained from the City and the City will not be responsible in any way for additional compensation for excavation work performed under the contract due to the Contractor's assumptions or deductions based on said subsurface data. The Contractor agrees that no claims will be made against the City, if, in carrying out the work, it is found that the actual subsurface conditions encountered do not conform to those indicated by said borings, test excavations and other subsurface investigations.

All soil data obtained from the City is for information only and indicates conditions existing at the time of the tests. The information is not guaranteed to be indicative of any subsurface condition except at the particular and exact locations of the borings.

102.06 Preparation of Proposal. The bidder shall submit the proposal upon the forms furnished by the City. All the words and figures shall be in ink or typed.

When an item in the proposal contains a choice to be designated by the bidder, the bidder shall indicate that choice in accordance with the specifications for that particular item, and thereafter no further choice will be permitted.

The bidder's proposal must be signed with ink by the individual, by one or more members of the partnership, by one or more members or officers of each firm representing a joint venture, or by one or more officers of a corporation, or by an agent of the Contractor legally qualified and acceptable to the City. If the proposal is made by an individual, the name and business address of that individual must be shown; if as a partnership, the names and business addresses of all general partners must be shown; if as a joint venture, the name and business address of each member of the joint venture must be shown; if by a corporation, the name of the state under the laws of which the corporation is chartered, the name of the corporation and the names and business addresses of its corporate officers must be shown; or if by any other business entity, the names and addresses of the principals of such entity. Anyone signing a proposal on behalf of a corporation must file with the proposal legal evidence of one's authority to do so.

Before a contract will be awarded to a foreign corporation or a person or partnership non-resident of the State of Ohio, such foreign corporation, person, or partnership non-resident shall file with the Secretary of State of Ohio a power of attorney designating his or its agent or the Secretary of State of Ohio, as agent, for the purpose of accepting service of summons, in any action in law or equity, or both, brought in the State of Ohio.

102.07 Irregular Proposals. Proposals will be considered irregular and may be rejected for reasons including but not limited to the following:

(a) If the proposal is on a form other than that furnished by the City, or if the form is altered or any part thereof is detached.

(b) If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.

8 If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award. This does not exclude a bid limiting the maximum gross amount of awards acceptable to any one bidder at any one bid letting, provided that any selection of awards will be made by the City.

(d) If the proposal is not signed by the bidder.

(e) If the proposal is not typed or written legibly in ink.

102.08 Proposal Guaranty. No proposal will be considered unless accompanied by a certified check, cashier's check, letter of credit, or a satisfactory bid bond, in an amount not less than ten percent of the bidder's proposal, including the base bid and all alternates conditioned upon execution of the contract and the furnishing of a performance bond in the event the contract is awarded to the bidder.

102.09 Delivery of Proposal. The proposal shall be placed, together with the proposal guaranty, in a sealed envelope so marked as to indicate the identity of the project and the name and address of the bidder. If forwarded by mail, said envelope shall then be placed in another envelope which shall be sealed and addressed as indicated in the proposal. Proposals will be received until the hour and date set for the opening thereof and must be in the hands of the official indicated by such time. Proposals received after the time for opening of bids will be returned to the bidder unopened.

102.10 Withdrawal of Proposals. No bidder may withdraw his proposal unless a written request to do so is submitted to the Director of Parks & Open Space prior to the time set for opening of the proposals. When such request is received, the proposal will be returned to the bidder unopened.

102.11 Public Opening of Proposals. Proposals will be opened and read publicly at the time and place designated by the Director of Parks & Open Space. Bidders, their authorized agents and other interested parties are invited to be present.

102.12 Statement of Materials. Before any contract is awarded, the bidder may be required to furnish a complete statement of the origin, composition, and manufacture of any or all materials to be used in the construction of the work together with samples, which samples may be subjected to the tests provided for in the specifications to determine their quality and fitness for the work.

102.13 Combination or Conditional Proposals. If the City so elects, proposals may be issued for the project in combination, unless otherwise stated on the proposal form. The City reserves the right to make awards on combination bids or separate bids to the best advantage of the City. No combination bids, other than those specifically stated on the proposal form by the City, will be considered. Separate contracts will be written for each individual project included in the combination.

103. - AWARD AND EXECUTION OF CONTRACT

- 103. 01 Consideration of Proposals**
- 103. 02 Award of Contract**
- 103. 03 Cancellation of Award**
- 103. 04 Return of Proposal Guaranty**
- 103. 05 Requirement of Contract Bond**
- 103. 06 Execution of Contract**
- 103. 07 Failure to Execute contract**
- 103. 08 Contractor's Insurance**

- 103.09 Fire and Builder's Risk Insurance**
- 103.10 Railroad Protective Insurance**
- 103.11 Workers' Compensation Insurance**

103.01 Consideration of Proposals. After the proposals are opened and read, they will be compared on the basis of the summation of the products of the approximate quantities shown in the proposal by the unit bid prices. In the event of a discrepancy between unit bid prices and extensions, the unit price shall govern.

The right is reserved to reject any or all proposals, to waive technicalities or to advertise for new proposals, if in the judgment of the awarding authority the best interests of the City will be promoted thereby.

The City reserves the right to hold proposals for a period of up to sixty days after the opening, and to award a contract at any time during that period.

103.02 Award of Contract. The award of the contract, if it be awarded, will be made as soon as is reasonably possible after the opening of the proposals to the lowest and best bidder whose proposal complies with all the requirements prescribed. In no case will an award be made until all necessary investigations are made as to the responsibility of the bidder to whom it intends to award the contract. The successful bidder will receive a Notice of Intent to Award sent to the bidder at the address shown in the proposal stating that its proposal has been accepted by the City.

103.03 Cancellation of Award. The City reserves the right to rescind the award of any contract at any time before the execution of said contract by all parties without any liability against the City.

103.04 Return of Proposal Guaranty. All proposal guaranties, except those of the three lowest bidders, will be returned immediately following the opening and checking of the proposals. The retained proposal guaranties of the three lowest bidders will be returned within ten days following the award of contract and that of the successful bidder will be returned after a satisfactory performance bond has been furnished and the Agreement for Construction has been executed.

103.05 Requirement of Performance Bond. The successful bidder must within ten days after receiving the Notice of Intent to Award and before execution of the Agreement for Construction by the City, furnish a performance bond in the form provided by Ohio Revised Code Section 153. 57 in the full amount of the proposal. Said bond shall cover the entire contract including the guarantee period required under 109. 11. The successful bidder's failure to submit a performance bond with the executed Agreement for Construction shall be deemed a refusal by the bidder to enter into a contract and shall release the City from all obligations to the bidder.

103.06 Execution of Contract. The Agreement for Construction shall be signed by the successful bidder and returned, together with the performance bond and other required contract documents, within ten days after the bidder has received the Notice of Intent to Award.

103.07 Failure to Execute Contract. Failure of the bidder to execute the Agreement for Construction and file an acceptable performance bond shall be just cause for the cancellation of the award and the forfeiture of the proposal guaranty which shall become the property of the City, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest and best bidder, or the work may be re-advertised as the Director of Parks & Open Space may decide.

103.08 Contractor's Insurance.

(A) General. The Contractor shall secure and maintain, at his/her own expense, until completion of the contract, general liability and property insurance as shall protect him and the City from claims for personal injury or property damage which may arise because of the nature of the work or from operations under this contract.

(B) General Liability. The Contractor shall have General Liability coverage on a per project basis, per occurrence, and in comprehensive form. General Liability coverage shall include Products/Completed Operations, Explosion Underground and Collapse Hazard, Premises Operations, Contractual, Independent Contractors, Broad Form Property Damage and Personal Injury.

The Contractor shall provide General Liability and Excess General Liability coverage in the following amounts, at a minimum:

Projects less than \$1,000,000: Contractor shall have total limits of insurance to include primary and excess coverage in an amount not less than \$2,000,000. (Examples: may be \$1,000,000 primary and \$1,000,000 excess, \$2,000,000 primary, or other equivalent combination.)

Projects greater than \$1,000,000: Contractor shall provide total limits of insurance to include primary and excess coverage in an amount of not less than \$5,000,000. (Examples: may be \$1,000,000 primary and \$4,000,000 excess, \$2,000,000 primary and \$3,000,000 excess, or other equivalent combination.)

8 Automobile Liability. The Contractor shall secure, and maintain, at his/her own expense, until the completion of the Contract, coverage for any auto, including non-owned and hired autos, with a combined single limit of \$1,000,000 per occurrence. The City shall be named as an Additional Insured.

(D) Workers' Compensation Insurance. Before beginning work, the Contractor shall furnish to the City satisfactory proof that he/she has, for the period covered under the Contract, full Workers' Compensation coverage for all persons whom he/she may employ directly, or through subcontractors, in carrying out the work contemplated under the Contract, and shall hold

the City free and harmless for all personal injuries of all persons whom the Contractor may employ directly or through subcontractors.

(E) Additional Insured. The Contractor shall name the City of Dublin, Ohio as an "Additional Insured" on all insurance policies, except Workers' Compensation, and this shall be reflected on the Certificate of Insurance.

(F) Cancellation Notice or Material Change of Coverage. The Contractor's required insurance shall be endorsed to provide that the policy(ies) will not be canceled, reduced, discontinued, or otherwise materially altered during the period of performance without thirty (30) days prior written notice to the Director of Parks & Open Space.

(G) Certificate(s) of Insurance. Prior to commencing work under each contract or subcontract, certificates of insurance shall be submitted and approved by the City. The Contractor is responsible for obtaining certificates of insurance establishing that the Contractor and all subcontractors have complied with insurance requirements previously stated.

(H) Rating of Insurance Company(ies). Any and all insurance company(ies) supplying coverage to the Contractor must have no less than an A- rating in accordance with the A. M. Best rating guide.

104. - SCOPE OF WORK

- 104. 01 Intent of Contract**
- 104. 02 Alteration of Plans or Character of the Work**
- 104. 03 Extra Work**
- 104. 04 Modification of Contract**
- 104. 05 Maintenance of Traffic and Accessibility to Utilities**
- 104. 06 Materials Found on the Work Site**
- 104. 07 Final Cleaning Up**

104.01 Intent of Contract. The intent of the contract is to provide for the construction and completion in every detail of the work described. The Contractor shall perform all items of work covered and stipulated in the proposal and perform altered and extra work, furnish all labor, materials, equipment, tools, transportation and supplies required to complete the work in accordance with the plans, specifications and terms of the contract. Should any misunderstanding arise as to the intent or meaning of the plans, specifications, special provisions or proposal, or any discrepancy appear, the decision of the Director of Parks & Open Space shall be final and conclusive.

104.02 Alteration of Plans or Character of the Work. The City reserves the right to make, at any time during the progress of the work, such increases or decreases in quantities and such alterations in the details of construction, including alterations or alignments of road structures, grades, etc..., as may be found to be necessary or desirable. Such increases or decreases and alterations shall not invalidate the contract nor release the surety, and the Contractor agrees to perform the altered work the same as if it had been a part of the original contract. The

Contractor shall insure that coverage provided by the surety is maintained at the same value as the altered project value.

Unless such alterations and increases or decreases materially change the character of the work to be performed or the cost thereof, the altered work shall be paid for at the same unit prices as other parts of the work. In this case, all expenses for increased alterations and increased costs shall be borne solely by the Contractor. If, however, the character of the work or the unit costs thereof are materially changed, an allowance shall be made on such basis as may have been agreed to in advance of the performance of the work, or in case no such basis has been previously agreed upon, then an allowance shall be made, either for or against the Contractor, in such amount as the Director of Parks & Open Space may determine to be fair and equitable.

Should the Contractor encounter or the Director of Parks & Open Space discover during the progress of the work or any conditions at the site differing materially from those indicated in this contract, or unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract the Director of Parks & Open Space shall be promptly notified in writing of such conditions before they are disturbed. The Director of Parks & Open Space will thereupon promptly cause the investigation of conditions and if they are found to so materially differ and cause an increase or decrease in the cost of, or the time required for performance of the contract, an equitable adjustment will be made.

Latent physical subsurface conditions such as abandoned public and private utilities, ancient foundations or other such man-made structures of which the City and the Contractor could not have been aware, or reasonably could not have been aware of at the time of the execution of the contract, may qualify for adjustment in time of completion and increased cost of construction, all of which must be documented by the Contractor and submitted to the Director of Parks & Open Space for approval.

Any adjustment in compensation because of a change or changes resulting from one or more of the conditions described in the foregoing paragraphs will be made in accordance with the provisions of 104. 03 and 104. 04. Any adjustment in contract time because of changes will be made in accordance with the provisions of 108. 06.

104.03 Extra Work. Subject to 104. 04, the Contractor shall perform unforeseen work, for which there is no price included in the contract, whenever it is deemed necessary or desirable in order to complete fully the work as contemplated. Such work shall be performed in accordance with the specifications and as directed, and will be paid for as provided under 109. 04.

104.04 Modification of Contract. When it becomes necessary in the opinion of the Director of Parks & Open Space, in the prosecution of any work or improvement under contract, that alterations or extra work are needed, the same shall only be made upon a written change order approved by the City Manager. No such change order shall be effective until the price to be paid for the work or material, or both, under the altered or modified contract shall have been agreed upon in writing and signed by the Contractor and the City Manager on behalf of the City.

The Contractor shall have no claim for and nor be entitled to compensation for any such alterations or extra work until the same have been incorporated into appropriate change orders. All such change orders must be approved by the City Manager and have an appropriate Certification of Funds by the Finance Director of Dublin attached to the change order.

104.05 Maintenance of Traffic and Accessibility to Utilities. The Contractor shall at all times provide and maintain access to fire hydrants, water valves, water service boxes, gas valves, gas, service boxes, manholes and other similar appurtenances.

When so stated on the plans or in the proposal, public traffic shall be maintained during construction. This may be traffic through the project or it may be only cross traffic at intersections. Maintenance of traffic may be required only at certain stages of construction or at all times, if so noted.

At locations on the work where sewer or water line construction only is called for and a part of the existing pavement will remain in place, traffic will be maintained and ingress and egress to all public and private entrances shall be provided.

In the event of the complete closure of any street, alley or private drive, the Contractor shall notify the occupants of all premises affected by such closure as per 614. 04 of the CMSC.

Whenever the Contractor, for any reason, ceases operations on this contract for a period of fifteen or more calendar days, the Contractor, if so directed by the Director of Parks & Open Space, shall construct a temporary roadway to provide access to the premises affected by project operations. The temporary roadway shall be constructed of cinders, gravel, crushed stone or other acceptable materials and of suitable width and thickness to carry anticipated vehicles, as directed by the Director of Parks & Open Space. The temporary roadway shall be maintained by the Contractor in serviceable condition until such time that the contract work is resumed. The cost of constructing and maintaining the temporary roadway shall be borne by the Contractor.

Failure of the Contractor to perform the operations stated in this section when directed by the Director of Parks & Open Space, within a reasonable time as determined by the Director of Parks & Open Space, will give the City authority to perform the work and bill the cost of same to the Contractor.

All traffic control devices shall be furnished, erected, maintained and removed by the Contractor in accordance with the OMUTCD and paid for in accordance with the provisions of 614 of the CMSC. When the proposal does not include the cost of maintaining traffic, this work shall be performed but will not be paid for directly, and the cost of this work shall be included in the price bid for various items in the proposal. The provisions of these items and this section shall not in any way relieve the Contractor of any of his legal responsibilities or liabilities for the safety of the public. The attention of the bidder is directed to the provisions of 107. 02 (Permits, Licenses, and Taxes) and 107. 08 (Public Convenience and Safety).

104.06 Materials Found on the Work Site. The Contractor may use stone, gravel, sand or other material found on the work site subject to approval by the Director of Parks & Open Space.

The Contractor shall be paid for the excavation of such stone, gravel, sand or other material at the unit prices set forth in the proposal for such items; provided however that the cost of any additional inspections directed by the Director of Parks & Open Space for such materials shall be deducted from the payments to the Contractor for such materials. The Contractor, at its expense, shall replace the material removed with material approved by the Director of Parks & Open Space. The Contractor shall not excavate or remove any material from within the project location which is not within the grading limits, as indicated by the slope and grade lines, without written authorization from the Director of Parks & Open Space.

Unless otherwise provided, the material from any existing old structure may be used temporarily by the Contractor in the erection of the new structure. Such material shall not be cut or otherwise damaged except with the approval of the Director of Parks & Open Space.

104.07 Final Cleaning Up. Before final acceptance, all ground occupied by the Contractor in connection with the work shall be cleaned of all rubbish, excess materials, temporary structures, and equipment. These areas shall have suitable vegetative cover established by seeding and mulching or sodding as required by 659 or 660 of the CMSC, the cost of which to be included in various items bid, unless a separate bid item is provided in the proposal, and all parts of the work shall be left in an acceptable condition.

105. - CONTROL OF WORK

- 105. 01 Authority of the Director of Parks & Open Space**
- 105. 02 Plans and Working Drawings**
- 105. 03 Conformity with Plans and Specifications**
- 105. 04 Coordination of Plans, Specifications, Supplemental Specifications and Special Provisions**
- 105. 05 Cooperation by Contractor**
- 105. 06 Night Work and Sundays**
- 105. 07 Work on National Holidays**
- 105. 08 Cooperation with Utilities**
- 105. 09 Cooperation Between Contractors**
- 105. 10 Construction Stakes, Lines and Grades**
- 105. 11 Photographs and Videos**
- 105. 12 Authority and Duties of the Inspector**
- 105. 13 Inspection of Work**
- 105. 14 Unauthorized Work**
- 105. 15 Load Restrictions**
- 105. 16 Maintenance During Construction**
- 105. 17 Failure to Maintain Roadway or Structures, Traffic Control Facilities and Other Appurtenances**
- 105. 18 Borrow and Waste Areas**
- 105. 19 Use of Fire Hydrants**
- 105. 20 Claims**
- 105. 21 Moving of Equipment**

105.01 Authority of the Director of Parks & Open Space. The Director of Parks & Open Space will decide all questions which may arise as to the quality and acceptability of materials furnished, work performed and rate of progress; all questions which may arise as to conformity with plans, specifications and other contract documents; all questions as to the acceptable fulfillment of the contract on the part of the Contractor; and all questions which may arise as to interpretation of the plans, specifications, and other contract documents.

The Director of Parks & Open Space has immediate charge of the engineering details of each construction project and is responsible to insure that the Contractor satisfactorily administers and completes the project. The Director of Parks & Open Space has the authority to reject defective material and to suspend any work that is being improperly performed.

The Director of Parks & Open Space will have the authority to suspend the work wholly or in part due to the failure of the Contractor to correct conditions unsafe for the workers or the general public; for failure to carry out provisions of the contract; for failure to carry out orders; and for such periods as may be deemed necessary due to unsuitable weather. The suspension of the work for the above reasons does not relieve the Contractor of responsibility according to 107.14.

In the event the Director of Parks & Open Space orders the work suspended for unsafe conditions (whether they be unsafe to workers or the public), unsuitable weather, use of defective material not in conformity with the specifications or because work is being improperly performed, the expense, whether direct or indirect, for such suspension shall be borne solely by the Contractor.

105.02 Plans and Working Drawings. The plans will show location and design details of all structures, lines, grades, and typical cross sections of roadways, conduits and all other items required by the contract. The Contractor shall keep one set of the plans available at the project site at all times.

The Contractor shall be responsible for the furnishing of copies of plans, specifications and special provisions, or the necessary portions thereof, to subcontractors and parties furnishing labor, materials and equipment for the project.

The plans will be supplemented by such working drawings as are necessary to adequately control the work. Working drawings for structures shall be furnished by the Contractor and shall consist of such detailed plans as may be required to adequately control the work and are not included in the plans furnished by the City. All working drawings must be approved by the Director of Parks & Open Space and such approval shall not operate to relieve the Contractor of any responsibility under the contract for the successful completion of the work. Where work consists of repairs, extensions or alterations of existing structures, the Contractor shall make such measurements of original construction as may be required to accurately join old and new work. Any measurements which may appear upon the plans to indicate the extent and nature of such repair or extension shall not relieve the Contractor of this responsibility. The contract price will include the cost of furnishing all working drawings.

105.03 Conformity with Plans and Specifications. All work performed and all materials furnished shall be in conformity with the lines, grades, cross sections, dimensions and material requirements, including tolerances, shown on the plans or indicated in the specifications.

In the event that the Director of Parks & Open Space finds the materials, or the finished product in which the materials are used, not in conformity with the plans and specifications, but that acceptable work has been produced, the Director of Parks & Open Space shall then make a determination if the work shall be accepted and remain in place. In this event, the Director of Parks & Open Space will document the basis of acceptance by change order which will provide for an appropriate adjustment in the contract price for such work or materials as the Director of Parks & Open Space deems necessary.

In the event the Director of Parks & Open Space finds the materials of the finished product in which the materials are used or the work performed are not in conformity with the plans and specifications and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed, replaced or otherwise re-mediated by, and at the expense of, the Contractor.

Failure of the Contractor to follow the order of the Director of Parks & Open Space pursuant to this section shall give the City the unqualified right to remove, replace, or otherwise remediate the defective work or materials any and all expense incurred by the City, directly or indirectly, shall be deducted or billed to the Contractor at the option of the Director of Parks & Open Space.

105.04 Coordination of Plans, Specifications, Supplemental Specifications and Special Provisions. The specifications, the supplemental specifications, the plans, special provisions, proposal, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions, plan notes will govern over specifications, supplemental specifications will govern over specifications; proposals and special provisions will govern over both specifications and plans.

The Contractor shall take no advantage of any apparent error or omission in the plans or specifications. In the event the Contractor discovers such an error or omission, it shall immediately be made known to the Director of Parks & Open Space. The Director of Parks & Open Space will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications.

105.05 Cooperation by Contractor. The Contractor must obtain one copy of the specifications and two sets of the plans at the Contractor's own cost and keep available at least one set of the specifications, the plans and all other contract documents including special provisions at the project site at all times.

Unless otherwise provided for in the plans or proposal, no work shall be commenced under this contract until a pre-construction conference has been held. In general, fourteen days are required to notify all interested parties of a pre-construction conference. Upon confirmation of a valid contract, the Director of Parks & Open Space will fax or mail, via U.S. postal service-first class, pre-construction conference notices to all parties. The Contractor shall take due note of this

requirement and aid in the timely scheduling of the pre-construction conference to avoid unnecessary delays in the commencement of the work. Following the pre-construction conference, the Director of Parks & Open Space will issue a Notice to Proceed to the Contractor. The Contractor is required to commence work within ten days from the date of receipt of the Notice to Proceed.

The Contractor shall give the work the constant attention necessary to facilitate the progress thereof, and shall cooperate with the Director of Parks & Open Space, inspectors and other Contractors in every way possible.

The Contractor shall have on the project at all times a competent superintendent, acting as an authorized agent, capable of reading and thoroughly understanding the plans and specifications and thoroughly experienced in the type of work being performed, who shall receive instructions from the Director of Parks & Open Space or an authorized representative. The superintendent shall have the full authority to execute orders or directions of the Director of Parks & Open Space without delay and to promptly supply such materials, equipment, tools, labor and incidentals as may be required. Such superintendence shall be furnished irrespective of the amount of work sublet.

Where the work extends across private property, the Contractor shall conduct operations in strict conformity with the terms and conditions of the easements and agreements obtained from the owners of the property. The City will not provide any points of access to any of these easements other than at points shown or described in the agreement with the property owner. Arrangements for the use of any additional points of access shall be made with the property owners by the Contractor at the Contractor's own expense.

The Contractor agrees to confine the work under this contract to the strict dimensions of easements, rights-of-way, or other work area authorized in writing by the City. Any failure of the Contractor, or the Contractor's agents, servants and employees to restrict the work in the defined area shall be the sole liability and responsibility of the Contractor who further agrees to save the City harmless from any activity of the Contractor's agents, servants, employees and subcontractors where such activity concerning work under this contract extends beyond the defined work area. The Contractor also agrees that where operations extend outside prescribed work areas, the City has the absolute right to suspend the work unless written evidence indicates permission from the property owner.

If the Contractor disperses any or all of its equipment to an area outside the work limits of the project, for any reason whatsoever, the re-marshaling and re-grouping of the equipment back to the work area shall be at the Contractor's expense. If the Contractor has been granted permission by the Director of Parks & Open Space to remove said equipment from the work area, then, at the discretion of the Director of Parks & Open Space, consideration may be given as to the amount of the City's participation, if any.

105.06 Night Work and Sundays. The Contractor agrees that all work on this contract which includes any and all subcontractors shall be only during the period from one-half hour before

sunrise and one-half hour after sunset as sunrise and sunset are determined by the U. S National Weather Service.

No work shall be permitted on Sundays unless authorized by the Director of Parks & Open Space.

Authorization of work during any other time shall only be upon written permission by the Director of Parks & Open Space, or as detailed on the plans or in the proposal, special provisions or supplemental specifications.

Failure of the Contractor to comply or failure of the Contractor to control any and all of his subcontractors for work under the contract to comply with the above provisions shall be cause to make all such work performed subject to removal and replacement at no additional expense to the City.

105.07 Work on National Holidays. No work will be permitted on National Holidays as listed in 101. 33 except as authorized or directed by the Director of Parks & Open Space. The provisions of 105. 06 shall apply with equal force to this provision.

105.08 Cooperation with Utilities. During the course of plan preparation for an improvement, the City shall notify all utility companies, all pipe line owners or other parties affected and endeavor to have all necessary adjustments of the public or private utility fixtures, pipe lines and other appurtenances within or adjacent to the limits of construction made as soon as possible so as not to interfere with the progress of the work. During the course of construction, the Contractor shall be solely responsible for notifying any utility or other service when such service is encountered as provided hereinafter.

The Contractor shall be solely and completely responsible for all above ground utilities, structures, and appurtenances, in regard to protection or replacement of same. The Contractor shall also be solely responsible for below ground utilities, structures, and appurtenances that may be accurately located by removing manhole covers, valve box covers, and other access point coverings, with reasonable effort using hand tools for such removal. The cost of protecting and/or replacing the utilities, structures, and appurtenances covered by this paragraph shall be borne solely by the Contractor and included in the various bid items in the contract.

Existing surface or overhead structures or utility lines are not necessarily shown on the drawings and those shown are only approximately correct. The Contractor shall make such investigations as are necessary to determine the extent to which existing surface or overhead structures may interfere with the prosecution of the work contemplated under this contract.

Existing subsurface structures or utility lines including sewer service connections but excluding all other service connections, which may be encountered during the construction of the work embraced under this contract or are located in such close proximity to the work under this contract as to require special precautions or methods for their protection, such as sewers, drains, sewage force mains, water mains, gas mains, telephone and electric conduits, together with appurtenances, are shown in the plans and drawings, insofar as there is public record of their

existence. The sizes, locations and depths shown are only approximately correct and the Contractor shall make such investigations or explorations as may be necessary to verify the accuracy of the information given. Furthermore, it is recognized that the exact locations of water mains are unknown, hence the Contractor shall, if so ordered, uncover and locate these mains ahead of the excavation for the work required by these specifications.

In accordance with Ohio Revised Code Section 153. 64, at least two working days prior to commencing construction operations, the Contractor shall notify the Director of Parks & Open Space, the registered utility protection service and the owners of each underground and overhead utility facility not members of the registered utility protection service.

Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cable-ways, signals and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners at their expense, except as otherwise provided for in the special provisions or as noted on the plans.

Water mains, services and appurtenances owned and/or maintained by the Division of Water, Department of Public Utilities, City of Columbus, Ohio shall be adjusted as indicated on the drawings or as specified at the Contractor's cost and expense in a manner approved by the Division of Water Department of Public Utilities, City of Columbus, Ohio, and no separate payment will be made unless a separate item is included in the contract therefore.

It is understood and agreed that the Contractor has considered in the Contractor's proposal all permanent and temporary utility appurtenances in their present or relocated positions and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by the Contractor due to any interference from said utility appurtenances or the operation of moving them, except that in those cases where, after written notification from the Contractor, the Director of Parks & Open Space determines that the character of the work to be performed or the cost thereof or the time provided therefore has been materially changed by such delays without the fault or negligence of the Contractor, an equitable adjustment shall be made.

If, through no fault of the Contractor, the progress of contract work is delayed for an unreasonable length of time from that proposed in the progress schedule of 108. 02 because of failure of a utility company to relocate or adjust its lines, the Contractor shall immediately file with the City a detailed statement describing the nature of the delay and its effect upon contract work progress.

It is the complete responsibility of the Contractor to determine the exact location of all substructures and utility lines of public utility facilities including but not limited to water, sewer, traffic, and electricity pipes or conduits shown on the plans including services lines not shown whether or not located on private property, public property, public or private right of ways, or public or private easements and of all surface or overhead structures, including but not limited to utility lines, telephone or electrical poles, growing things such as trees, sidewalks and driveways.

The Contractor shall have sole responsibility for paying for any damage done directly or indirectly to the above mentioned items as a result of the progress of the work performed under this contract, whether performed by the Contractor or the Contractor's subcontractor(s), agents, servants or employees, whether such damage results from negligence or otherwise, and whether the damage is to private or public property or real or personal property. The Contractor further agrees to save the City harmless from any such damages.

In the event that the Contractor fails to pay the entire cost of the damages as stated above within thirty days, or in the event litigation arises as a result of such damages, the Director of Parks & Open Space shall have the unqualified right to deduct and withhold the entire amount of the damages from the monies due or to become due to the Contractor until said damages are liquidated and the City is kept whole from any such expense.

The Contractor further covenants not to sue the City, either in law or equity, where such deduction and withholding is made by the City.

The City shall return, within a reasonable time thereafter not to exceed thirty days, the amount of the withheld funds which exceed the amount of damages paid by the City.

The Contractor further waives any and all rights, title or interest in any and all amounts of damages and court costs paid by the City.

105.09 Cooperation Between Contractors. The City reserves the right at any time to contract for and perform other or additional work on or near the work covered by the contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct its work so as not to interfere with or hinder the progress or completion of the work being performed by other contractors. Contractors working on the same project shall cooperate with each other as directed.

Each contractor involved shall assume all liability, financial or otherwise, in connection with his contract and shall protect and save harmless the City from any and all damages or claims that may arise because of inconvenience, delay, or loss experienced by him because of the presence and operations of other contractors working within the limits of the same project.

Each contractor shall arrange its work and shall place and dispose of the materials being used so as not to interfere with the operations of the other contractors within the limits of the same project. Each contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

105.10 Construction Stakes, Lines and Grades. The Contractor shall furnish and place construction layout stakes for the project in accordance with 623 of the CMSC. The Contractor shall notify the City at least two working days prior to the time that control points for line and grade will be needed. There shall be no compensation to the Contractor for the cost occasioned by delay in establishing lines, grades and elevations or making other necessary measurements or

by inspection; but such costs shall be considered as having been included in the price stipulated for doing the work called for in the contract.

All construction staking shall be performed under the supervision of a registered professional engineer or land surveyor. All field notes, cut sheets, etc. , shall be submitted to the City.

105.11 Photographs and Videos. From time to time during the progress of the work, photographs or videos of the work may be taken by the Director of Parks & Open Space, inspectors or other duly authorized City personnel or agents, at no expense to the Contractor. The Contractor shall, however, furnish access to the work at all times for this purpose and shall furnish such assistance as may be required. The photographs or videos thus taken shall be the property of the City. Nothing herein contained shall be construed as prohibiting the taking of photographs or videos by the Contractor or its agents, provided, however, that it is done at no cost or expense to the City.

105.12 Authority and Duties of the Inspector. Inspectors employed by the City will be authorized to inspect all work and materials furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication or manufacture of the materials to be used. Inspectors are not authorized to alter or waive the provisions of the contract, but shall have the authority to reject materials which do not meet specification requirements and to suspend the portion of the work involved until any question at issue can be referred to and decided by the Director of Parks & Open Space. Inspectors are not authorized to issue instructions contrary to the plans and specifications, or to act for the Contractor.

105.13 Inspection of Work. All materials and each part or detail of the work shall be subject to inspection by the Director of Parks & Open Space. The Director of Parks & Open Space or an authorized representative of the Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the Director of Parks & Open Space requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering or removing and the replacing of the covering or making good of the parts removed, will be at the Contractor's expense.

Any work done or materials used without supervision or inspection by the Director of Parks & Open Space or an authorized representative of the Director of Parks & Open Space may be ordered removed and replaced at the Contractor's expense. Failure to reject any defective work or material shall not in any way prevent later rejection when such defects be discovered, or obligate the City to final acceptance.

When any unit of government or political subdivision or railroad or any corporation is to pay a portion of the cost of the work covered by this contract, its respective representatives shall have the right to inspect the work. Such inspection shall in no sense make any unit of government or political subdivision or railroad or any corporation a part to this contract, and shall in no way interfere with the rights of either party hereunder.

105.14 Unauthorized Work. No work shall be done without control points having been given by the City. Work done contrary to the instructions of the Director of Parks & Open Space, work done beyond the control points, or any extra work done without authority will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the Director of Parks & Open Space under the provisions of this section, the Director of Parks & Open Space will have authority to cause unauthorized work to be removed and to deduct the costs from any monies due or to become due to the Contractor.

105.15 Load Restrictions. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads. A special permit will not relieve the Contractor from the Contractor's sole liability for damage which may result from the moving of equipment or materials, whether caused by the equipment of the Contractor or the Contractor's subcontractors.

The operation of equipment of such weight or so loaded as to cause damage to structures or the roadway or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course of a roadway under construction shall be limited as directed by the Director of Parks & Open Space. No loads will be permitted on a concrete pavement, base or structure before the expiration of the curing period. In no case shall legal load limits be exceeded unless permitted in writing. The Contractor shall be responsible for all damage done by the equipment of the Contractor or the Contractor's subcontractors.

105.16 Maintenance During Construction. The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces to the end that the roadway, conduits or structures are kept in satisfactory condition at all times.

In the case of a contract for the placing of a paving course upon a roadway subgrade previously constructed, the Contractor shall maintain the previous paving course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various pay items, and the Contractor will not be paid an additional amount for such work.

105.17 Failure to Maintain Roadway or Structures, Traffic Control Facilities and Other Appurtenance. If the Contractor, at any time, fails to comply with the provisions of 105. 17, the Director of Parks & Open Space will immediately notify the Contractor of such non-compli-

ance. If the Contractor fails to remedy unsatisfactory maintenance within twenty-four hours after receipt of such notice, the Director of Parks & Open Space may immediately proceed to maintain the project and the entire cost of this maintenance will be deducted from monies due or to become due the Contractor on this contract.

105.18 Borrow and Waste Areas. The terms "borrow area" and "waste area" as used in the specifications refer to locations outside the right-of-way from which natural materials are removed for use in the work or upon which materials from the work are to be deposited as waste.

Before any borrow or waste disposal operations are to begin, the Contractor shall submit his plan for operation, control of drainage water, cleanup, shaping, and restoration of the disturbed areas and obtain the Director of Parks & Open Space's written approval. The plan of operations shall include the saving of topsoil, and proposed measures to keep sediment and other contaminants from entering streams, lakes, and reservoirs by the use of methods such as diversion channels, dikes, sediment traps, and vegetation covers, etc. When it becomes necessary to locate such areas in or near streams, special precautions shall be taken.

The stability of borrow and waste areas and any damage to surrounding property resulting from movement of the area shall be the sole responsibility of the Contractor.

Restoration of all borrow or waste areas shall include cleanup, shaping, replacement of topsoil and establishment of vegetation cover by seeding and mulching in accordance with the requirements of 659 of the CMSC at no additional cost to the City. The restored area shall be well drained unless approval is given to convert a pit area into a pond or lake, in which case restoration measures shall be confined to the disturbed areas above the anticipated normal water level.

The cost of work described herein necessary to secure these results shall be included in the contract price bid for these items to which they apply.

105.19 Use of Fire Hydrants. The Contractor shall make the proper arrangements with the Dublin Service Department and the Division of Water, Department of Public Utilities, City of Columbus, Ohio for the use of fire hydrants when used for work performed under this contract.

Before the final estimate is paid, the Contractor shall submit a letter from the Division of Water, Department of Public Utilities, City of Columbus, Ohio, to the Director of Parks & Open Space stating that the Contractor and all subcontractors have returned the Siamese Valve to the Division of Water, Department of Public Utilities, City of Columbus, Ohio, and paid all costs arising from the use of the fire hydrants.

105.20 Claims.

(A) Early Notice. In the event the Contractor learns of circumstances ("Circumstances") perceived by the Contractor to be likely to give rise to a claim, the Contractor shall immediately inform the Director of Parks & Open Space of the Circumstances ("Early Notice"). The Contractor waives any part of the claim for costs incurred from the time the Contractor learns of

the Circumstances and before the Contractor notifies the Director of Parks & Open Space of same.

Notice of Claim. In the event the Contractor and the Director of Parks & Open Space disagree as to the responsibility of the parties under the contract concerning the Circumstances ("Disagreement"), then the Contractor shall submit to the Director of Parks & Open Space in writing within ten calendar days after the Contractor learns of the Disagreement, a Notice of Claim setting forth insofar as possible, the basis and the nature of the claim. The failure of the Contractor to timely submit a Notice of Claim constitutes a waiver of his right to any claim due to the Circumstances.

Estimates of Additional Costs and/or Time. Within ten calendar days of the date of submission of the Notice of Claim, the Contractor shall submit in writing to the Director of Parks & Open Space the Contractor's estimate of the additional cost to be incurred and any additional time required. If the Contractor fails to submit his estimate of additional cost and/or any additional time required within ten calendar days or such later date as agreed to with the Director of Parks & Open Space, the claim is abandoned and waived.

Records. From the time the Contractor learns of the Circumstances, the Contractor shall maintain complete and specific records of all matters relating to the preserved claim. The Director of Parks & Open Space shall have access to such records upon request.

Continuation of Work. Unless otherwise agreed to in writing, the Contractor shall, after giving Early Notice, continue with and carry on the work during the pendency of the claim, and the City will continue to make progress payments to the Contractor in accordance with the contract documents.

(B) Submission of Claim. As promptly as possible following the submission of the Notice of Claim, but in no event later than sixty calendar days after substantially all of the Contractor's costs are known to a reasonable certainty, the Contractor shall submit the claim to the Director of Parks & Open Space. If the Contractor fails to submit the claim within said sixty calendar days or such later date as agreed to with the Director of Parks & Open Space, the claim is abandoned and waived.

Content of Claim. The claim shall set forth clearly and in detail, for each item of additional compensation or extension of time requested:

- (a) The reasons for the claim.
- (b) References to the applicable provisions of the contract documents.
- (c) The nature and the specific cost ascribed to each element of the claim and for each period of time involved.
- (d) The basis used in describing each such element of cost or for each period of time.

- (e) Any other pertinent factual data.

Any claim, which in the opinion of the Director of Parks & Open Space is deficient in documentation, shall either be returned to the Contractor with comment as regards to the deficiencies or the Director of Parks & Open Space may, at the Director of Parks & Open Space's option, request additional information. The Contractor shall either furnish the additional information requested by the Director of Parks & Open Space within fifteen days of the request or such later time as agreed to with the Director of Parks & Open Space or state in writing to the Director of Parks & Open Space that the Contractor cannot or will not furnish such additional information, or the claim is abandoned and waived.

(C) The Decision of the Director of Parks & Open Space. The Director of Parks & Open Space shall render a written decision within sixty calendar days of the later of the date of receipt of the claim or the date of receipt of the supplemental information requested by the Director of Parks & Open Space. A failure of the Director of Parks & Open Space to render a decision within said sixty calendar days or such later time as agreed to with the Contractor constitutes a decision of denial. The decision of the Director of Parks & Open Space is final subject to an election by the Engineer to submit the matter to an alternative form of dispute resolution.

(D) Alternative Dispute Resolution. At the Director of Parks & Open Space's option and direction, the claim shall be submitted to arbitration, mediation, or some other form of alternative dispute resolution.

105.21 Moving of Equipment. Non-rubber tired vehicles or equipment shall not be moved on City streets. Exceptions may be granted by the Director of Parks & Open Space where short distances and special circumstances are involved. Exceptions must be in writing and any resulting damage must be repaired to the satisfaction of the Director of Parks & Open Space.

106. - CONTROL OF MATERIAL

- 106. 01 Source of Supply and Quality Requirements**
- 106. 02 Samples, Tests, Cited Specifications**
- 106. 03 Plant Inspection**
- 106. 04 Storage of Materials**
- 106. 05 Handling of Materials**
- 106. 06 Unacceptable Materials**
- 106. 07 City-Furnished Material**

106.01 Source of Supply and Quality Requirements. The materials used on the work shall meet all requirements of the contract. In order to expedite the inspection and testing of materials, the Contractor shall notify the Director of Parks & Open Space of the proposed sources of materials prior to delivery. At the option of the Director of Parks & Open Space, materials may be inspected at the source of supply before delivery is started. If it is determined by the Director of Parks & Open Space after trial, that sources of supply for previously approved materials do not produce specified products the Contractor shall furnish materials from other sources which shall, in turn, be subject to controls set forth herein.

The Contractor shall furnish or cause to be furnished delivery tickets or documents for all materials to be incorporated in the work, which tickets or documents shall describe in detail the type, size, specification or data, fully denoting the material being delivered.

106.02 Samples, Tests, Cited Specifications. All materials will be inspected, tested and compliance determined by the Director of Parks & Open Space before incorporation into the work. Unless otherwise designated, tests shall be made in accordance with AASHTO, ASTM or other methods on file in the Office of the Engineer. Except as provided in 105.03, tests shall be made at the expense of the City. Samples will be taken by a qualified representative of the City.

References included in these specifications to AASHTO, ASTM or Federal Specifications shall be the test method, sampling method or specification as amended to its issue date next preceding the bid opening date.

All materials being used are subject to inspection, test or rejection at any time prior to incorporation into the work. Copies of all tests will be furnished to the Contractor's representative. The Contractor, in all cases, shall furnish the required samples without charge.

Transports and distributors hauling bituminous material shall be equipped with an approved submerged bituminous material sampling device.

If, in the judgment of the Director of Parks & Open Space, the quantity used of any one material is so inconsequential as to not warrant testing in accordance with the minimum requirements for sampling materials in Chapter 900 of the CMSC, verification of the quality of the material may be covered by a Field Inspection Report of Materials, prepared by the Director of Parks & Open Space.

106.03 Plant Inspection. The Director of Parks & Open Space or an authorized representative may undertake the inspection of materials at the source.

In the event plant inspection is undertaken the following conditions shall be met:

(a) The Director of Parks & Open Space shall have the cooperation and assistance of the Contractor and the producer with whom he has contracted for materials.

(b) The Director of Parks & Open Space or an authorized representative shall have full entry at all times to such parts of the plant as may concern the manufacture or production of the materials being furnished.

8 If required by the Director of Parks & Open Space, the Contractor shall arrange for an approved building for the use of the inspector; such building to be located conveniently near the plant, independent of any building used by the material producer.

(d) Adequate safety measures shall be provided and maintained.

It is understood that the City reserves the right to re-test all materials prior to incorporation into the work which have been tested and accepted at the source of supply after the same have been delivered and to reject all materials which, when re-tested, do not meet the requirements of the specifications, or those established for the specific project.

106.04 Storage of Materials. Materials shall be so stored as to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located so as to facilitate their prompt inspection. Approved portions of the right-of-way may be used for storage purposes and for the placing of the Contractor's plant and equipment, but any additional space required therefor must be provided by the Contractor at no expense to the City. Private property shall not be used for storage purposes without written permission of the owner or lessee, and if requested by the Director of Parks & Open Space, copies of such written permission shall be furnished. All storage sites shall be restored to their original condition by the Contractor at no expense to the City.

106.05 Handling of Materials. All materials shall be handled in such manner as to preserve their quality and fitness for the work. Aggregate shall be transported from the storage site to the work in tight vehicles so constructed as to prevent loss or segregation of materials after loading and measuring in order that there may be no inconsistencies in the quantities of materials intended for incorporation in the work as loaded, and the quantities as actually received at the place of operations.

106.06 Unacceptable Materials. All materials not conforming to the requirements of the specifications at the time they are used shall be considered unacceptable and shall be removed immediately from the site of the work unless otherwise instructed by the Director of Parks & Open Space. No materials, the defects of which have been corrected, shall be used until approval has been given. Upon failure on the part of the Contractor to comply immediately with any order of the Director of Parks & Open Space made under the provisions of this section, the Director of Parks & Open Space shall have authority to remove and replace defective materials and to deduct the cost of removal and replacement from any monies due or to become due to the Contractor.

106.07 City-Furnished Material. The Contractor shall furnish all materials required to complete the work, except when otherwise provided in the proposal.

Materials furnished by the City will be delivered or made available to the Contractor at the points specified in the special provisions.

The cost of handling and placing all materials after they are delivered to the Contractor shall be considered as included in the contract price for the item in connection with which they are used.

The Contractor will be held responsible for all delivered materials, and deductions will be made from any monies due the Contractor to make good any shortages and deficiencies, from any cause whatsoever, and for any damage which may occur after such delivery, and for any demurrage charges.

107. - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

107. 01	Laws to be Observed
107. 02	Permits, Licenses and Taxes
107. 03	Patented Devices, Materials and Processes
107. 04	Restoration of Surfaces Opened by Permit
107. 05	Federal Aid Provisions
107. 06	Sanitary Provisions
107. 07	First Aid
107. 08	Public Convenience and Safety
107. 09	Barricades and Warning Signs
107. 10	Maintenance of Traffic
107. 11	Use of Explosives
107. 12	Protection and Restoration of Property
107. 13	Responsibility for Damage Claims
107. 14	Contractor's Responsibility for Work
107. 15	Contractor's Responsibility for Utility Property and Services
107. 16	Furnishing Right-of-Way
107. 17	Personal Liability of Public Officials
107. 18	No Waiver of Legal Rights
107. 19	OSHA

107.01 Laws to be Observed. The Contractor shall keep fully informed of all federal, state and local laws, ordinances, and regulations and all orders and decrees of authorities having any jurisdiction or authority, which in any manner affect those engaged or employed in the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the City and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's subcontractor(s), agents or employees.

The Contractor agrees that in the hiring of employees for the performance of work under this contract or any subcontract hereunder, neither the Contractor nor any of the Contractor's subcontractors, nor any person acting on behalf of the Contractor or any of its subcontractors, shall, by reason of race, creed or color, discriminate against any citizen of the United States in the employment of labor or workers, who is qualified and available to perform the work to which the employment relates and that neither the Contractor nor any of the Contractor's subcontractors, nor any of their employees or agents shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, creed or color.

107.02 Permits, Licenses and Taxes. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the work.

Prior to the closure of or working in or on any portion of a street the Contractor shall obtain a permit through the Director of Parks & Open Space.

107.03 Patented Devices, Materials and Processes. If the Contractor employs any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the patentee or owner. The Contractor and the surety shall indemnify and save harmless the City, any affected third party or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process or any trademark or copyright, and shall indemnify the City for any costs, expenses, and damages which it may be obliged to pay by reason of any infringement, at any time during the prosecution of or after the completion of the work.

In the case of patented pavements and wearing courses, where royalties, licensing and proprietary service charges, exacted or to be exacted by the patentees, are published and certified agreements are filed with the City, guaranteeing to prospective bidders free unrestricted use of all such proprietary rights and trademarked goods upon payment of such published charges, such patented payments may be specifically designated in the proposal and competition secured upon the item exclusive of the patent or proprietary charges.

107.04 Restoration of Surfaces Opened by Permit. The right to construct or reconstruct any utility service in the highway or street or to grant permits for same, at any time, is hereby expressly reserved by the Director of Parks & Open Space, and the Contractor shall not be entitled to any damages either for the digging up of the street or for any delay occasioned thereby.

Any individual, firm, or corporation wishing to make an opening in the street must secure a permit through the Director of Parks & Open Space. The Contractor shall allow parties bearing such permits, and only those parties, to make openings in the street. When ordered by the Director of Parks & Open Space, the Contractor shall make in an acceptable manner all necessary repairs due to such openings and such necessary work will be paid for as extra work, or as provided in these specifications, and will be subject to the same conditions as original work performed.

107.05 Federal Aid Provisions. When the United States Government pays all or any portion of the cost of a project, the Federal laws and the rules and regulations made pursuant to such laws must be observed by the Contractor and the work shall be subject to the inspection of the appropriate federal agency.

Such inspection shall in no sense make the federal government a party to this contract and will in no way interfere with the rights of either party hereunder.

107.06 Sanitary Provisions. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees and City representatives as may be necessary to comply with the requirements of the state and local boards of health, or of other authorities having jurisdiction.

107.07 First Aid. The Contractor shall provide and keep upon the work a completely equipped first aid kit and shall provide ready access thereto at all times when workers are employed on the work. The Contractor shall designate some proper person or persons to be in charge of administering first aid and shall cause such person or persons to receive proper instructions therein.

107.08 Public Convenience and Safety. The Contractor shall at all times so conduct contract work as to assure the least possible obstruction to traffic. The safety and convenience of the general public and the residents along the street and the protection of persons and property shall be provided for by the Contractor as specified under 104. 05.

The Contractor shall provide and maintain safeguards, safety devices and protective equipment and take any other needed actions as may be necessary to protect the public and property in connection with the work.

The presence of barricades or lights, provided and maintained by any party other than the Contractor, shall not relieve the Contractor of this responsibility.

107.09 Barricades and Warning Signs. Temporary traffic control devices and facilities shall be furnished, erected, maintained and paid for in accordance with the provisions of 614 of the CMSC (Maintaining Traffic). All traffic control devices shall conform to Part 7 of the OMUTCD for Streets and Highways as amended, as required under Ohio Revised Code Section 4511. 09. The provisions of this item and this section shall not in any way relieve the Contractor of any of the Contractor's legal responsibilities or liabilities, for the safety of the public.

107.10 Maintenance of Traffic. All work shall be performed in accordance with 614 of the CMSC, except that unless an item for maintaining traffic is included in this contract, the cost of this work shall be included in the prices bid for the various items of the contract and there will be no separate payment made there for.

To avoid interruption of bus and coach operations, the Contractor shall give sufficient advance notice to the company or companies concerned, to permit rerouting of lines, if necessary, prior to the commencement of work.

When material is piled in the gutters, suitable drains of sufficient size to carry all the storm water flowing in the gutters, shall first be laid. Where the drainage from cross streets or alleys is interfered with or cut off by reason of the nature of the work, suitable crossings shall be provided for pedestrians. No material shall be piled within twenty feet of any fire hydrant.

The Contractor shall notify the appropriate fire department, and the City of Dublin Police Department whenever a street or section of street is about to be closed to traffic and also when it is to be opened.

107.11 Use of Explosives. Blasting shall not be permitted. Under certain special conditions, the Director of Parks & Open Space may request blasting. In such cases, the Contractor shall use the highest degree of care and adequate protective measures so as not to endanger life, completed portions of the project, and all other property, both public and private. Before conducting any blasting operations, the Contractor shall furnish the Director of Parks & Open Space, in writing, a schedule of intended blasting operations and the Contractor shall give the Director of Parks & Open Space prior written notification of any changes in such schedule. The Contractor shall provide proof of special hazard insurance as set forth under 103.08.

The use, handling, storage and transportation of explosives shall conform and be in accordance with the applicable requirements and/or provisions of:

- (a) the latest revision of "State of Ohio Administrative Code Chapter 4121:1-3," issued by the Department of Industrial Relations and the Industrial Commission of the State of Ohio;
- (b) the Ohio Explosive Laws, Ohio Revised Code Sections 3743.01 - 3743.26;
- 8 local regulations; and
- (d) as specified herein.

The Contractor shall secure a written permit from the appropriate fire department before any blasting work is begun.

Except in the case of continuous tunnel operations, all blasting shall be conducted during daylight hours only with the provision that when required by the Director of Parks & Open Space, blasting shall be limited to certain daylight hours. All firing shall be done by electrical means or any suitable, manufactured, non-electric blasting system which allows the blaster to control the exact moment in which firing of the shot will occur. The Contractor shall make suitable provisions to prevent the scattering of broken rock, earth, stones or other material during blasting operations.

107.12 Protection and Restoration of Property. The Contractor shall be responsible for the preservation of all public and private property.

The Contractor shall be responsible for all damage or injury to property during the prosecution of the work, resulting from any act omission, neglect, or misconduct in any manner or method of executing the work, or at any time due to defective work or materials.

Dust, mud, noise or other nuisance originating from any plant operations either inside or outside the right-of-way shall be controlled by the Contractor in accordance with local ordinances and regulations at the sole expense of the Contractor.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work; or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding or otherwise restoring as may be directed by the Director of Parks & Open Space, or shall make good such damage or injury in an acceptable manner. The cost of all work associated with said restoration shall be at no additional cost to the City.

The Contractor shall cooperate with the Director of Parks & Open Space in protecting and preserving cornerstones and monuments that may be within the right-of-way. The Contractor shall not start grading or resurfacing operations until the Director of Parks & Open Space has referenced all known cornerstones, monuments and land-markers in the area to be improved. Monuments, cornerstones and land-markers unexpectedly encountered shall be protected, referenced and preserved in the same manner.

When cornerstones, monuments and land-markers are encountered in the performance of the work, and monument covers are not listed in the proposal, the City will furnish them and supervise their precise location and installation, and the Contractor will furnish all the labor, tools and other materials required incidental to such installations. Any labor, tools and materials so furnished shall be paid for as force account work.

The cost to the City for repair, re-evaluation of location and replacement of any cornerstone, monument or land-marker within the project, damaged, destroyed, or made inaccessible during the progress of the work by the Contractor or the Contractor's employees, in violation of these provisions, is a charge deductible from any estimate payable on account of the work.

107.13 Responsibility for Damage Claims. The Contractor and the surety shall save harmless the City and all of its representatives, or any participating railroad or railway company, from all suits, actions, or claims of any character brought on account of any injuries or damages sustained by any person or property in consequence of any neglect in safeguarding the work or through the use of unacceptable materials in the construction of the improvement or on account of any act or omission, by the Contractor, or its agents. The Contractor or the Surety shall pay any judgment obtained or growing out of any such claims or suits.

107.14 Contractor's Responsibility for Work. Until final written acceptance of the project by the Director of Parks & Open Space, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements, from vandalism, from vehicular accidents, or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God, of the public enemy or governmental authorities.

In case of suspension of work by the Contractor, or under the provisions of 105.09, the Contractor shall be responsible for the project and shall take such precautions as may be necessary to prevent damage to the project, provide for adequate drainage and shall erect any necessary temporary structures, signs, or other facilities at the Contractor's expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

107.15 Contractor's Responsibility for Utility Property and Services. At points where the Contractor's operations are adjacent to properties of railway, telegraph, telephone, and power companies, or are adjacent to other utilities or property, damage to which might result in considerable expense, loss, or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

The Contractor shall cooperate with the owners of any underground or overhead utility lines in their protection and in removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

In the event of interruption to water or utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with the said authority in the restoration of service. If water or sewer service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the appropriate fire department.

107.16 Furnishing Right-of-Way. The City will be responsible for the securing of all necessary rights-of-way in advance of construction deemed necessary by the City. Any exceptions will be indicated in the contract.

107.17 Personal Liability of Public Officials. In carrying out any of the provisions of the specifications, or in exercising any power or authority granted to them by or within the scope of the contract, there shall be no liability upon the City Manager, the Director of Parks & Open Space, or their authorized representatives, either personally or as officials of the City, it being understood that in all such matters they act solely as agents and representatives of the City.

107.18 No Waiver of Legal Rights. Neither the inspection by the Director of Parks & Open Space, nor by any inspector or duly authorized City representatives nor any order, measurements, or certificate by the Director of Parks & Open Space, or said representatives, nor any order by the Director of Parks & Open Space, for the payments of money, nor any payment for, nor acceptance of any work by the Director of Parks & Open Space, nor any extension of time, nor any possession taken by the City or its duly authorized representatives, shall operate as a waiver of any provision of this contract, or of any power herein reserved to the City, or any right to damages herein provided; nor shall any waiver of any breach of this contract be held to be a waiver of any other subsequent breach.

107.19 OSHA. All Contractors shall comply with the provisions of the Occupational Safety and Health Act of 1972 and all amendments thereto.

108. - PROSECUTION AND PROGRESS

- 108.01 Subletting of Contract**
- 108.02 Prosecution and Progress**
- 108.03 Suspension of Work**
- 108.04 Limitation of Operations**
- 108.05 Character of Workers, Methods, and Equipment**
- 108.06 Date for Completion**
- 108.07 Liquidated Damages**
- 108.08 Cancellation of Contract**
- 108.09 Certified Payroll**

108.01 Subletting of Contract. The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the contract or contracts or any portion thereof, or of its right, title, or interest therein, without written consent of the Director of Parks & Open Space. In case such consent is given, the Contractor will be permitted to subcontract a portion thereof, but shall perform with the Contractor's own organization, work amounting to not less than fifty percent of the total contract cost, except that any items set forth in the proposal to be "specialty items" may be performed by subcontract and the cost of any such specialty items so performed by subcontract may be deducted from the total cost before computing the amount of work required to be performed by the Contractor's own organization. No subcontract, or transfer of contract, shall in any case release the Contractor of liability under the contract and bonds.

108.02 Prosecution and Progress. The Contractor shall submit a progress schedule on an approved form within ten days after the Notice to Proceed has been issued showing how the Contractor proposes to prosecute the work. If the Contractor's operations are materially affected by changes in the plan or in the amount of the work or if the Contractor has failed to comply with the approved schedule, the Contractor shall submit a revised progress schedule, if requested by the Director of Parks & Open Space, which schedule shall show how the Contractor proposes to prosecute the balance of the work. The Contractor shall submit the revised progress schedule within ten days after the date of the request. The Contractor shall incorporate into every progress schedule submitted, any contract requirements regarding the order of performance of portions of the work. The Contractor shall use all practicable means to make the progress of the work conform to that shown on the progress schedule which is in effect. Acceptance by the City of the revised progress schedule shall not serve as a time extension approval. Any extension of the contract completion date must be processed per 108.06. No payment will be made to the Contractor while the Contractor is delinquent in the submission of a progress schedule. Should the prosecution of the work, for any reason, be discontinued, the Contractor shall notify the Director of Parks & Open Space at least one working day in advance of resuming operations. No payment will be made to the Contractor if the Contractor is delinquent in the submission of a progress schedule. Should the prosecution of the work, for any reason, be discontinued, the

Contractor shall notify the Director of Parks & Open Space at least two working days in advance of resuming operations.

On contracts which are complicated and interdependent in nature, a Critical Path Method type progress diagram may be required by the special provisions to the contract.

Progress schedules and diagrams are to be included in unit price bids of the various contract items, unless a specific bid item is included in the contract.

108.03 Suspension of Work. The Director of Parks & Open Space may instruct the Contractor to delay the start of operations or suspend the Contractor's operations in whole or in part, for the length of time the Director of Parks & Open Space may deem necessary. The Contractor shall start or resume the operations when notified to do so by the Director of Parks & Open Space.

If, without the fault or negligence of the Contractor, the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Director of Parks & Open Space in the administration of the contract or by failure to act within the time specified in the contract (or if no time is specified within a reasonable time), an adjustment shall be made by the Director of Parks & Open Space for any increase in the cost of performance of the contract (excluding profit) necessarily caused by the unreasonable period of such suspension, delay, or interruption, and the contract shall be modified in writing.

If construction under these specifications is suspended, delayed, or interrupted through no fault of the Contractor by an order of a court of competent jurisdiction or the Environmental Protection Agency, such suspension, delay, or interruption will be considered to be an unreasonable suspension, delay, or interruption.

In the event that additional expense or loss due to suspension includes machinery or equipment idled by such act or failure to act, payment therefore may be allowed only for machinery or equipment actually on the project site required for those phases of the construction work to which such order applies, and such payment shall be made at the following rates: for idled machinery or equipment owned by the Contractor, fifty percent of the rental price; and for idled machinery or equipment rented by the Contractor, the actual rental price paid plus fifteen percent thereof. The maximum rental price shall be as set forth in the current Equipment Guide Blue Book.

108.04 Limitation of Operations. The Contractor shall conduct the work at all times in such a manner and in such sequence as will assure the least interference with traffic and other operations of the public. The Contractor shall have due regard to the location of detours and to the provisions for handling traffic. The Contractor shall not open up work to the prejudice or detriment of work already started. The Director of Parks & Open Space may require the Contractor to finish a section on which work is in progress before work is started on any additional sections if the opening of such section is essential to public convenience.

108.05 Character of Workers, Methods, and Equipment. The Contractor shall at all times employ sufficient competent labor and equipment for prosecuting the several classes of work to full completion in the manner and time required by these specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform all work properly and satisfactorily.

Any person employed by the Contractor or by any subcontractor who, in the opinion of the Director of Parks & Open Space, does not perform their work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Director of Parks & Open Space, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without the approval of the Director of Parks & Open Space. Should the Contractor fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Director of Parks & Open Space may withhold all estimates, which are or may become due, or may suspend the work by written notice until the Contractor complies with such orders.

All equipment which is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet the requirements of the work and produce a satisfactory quality of work. Equipment used on any portion of the project shall be such that no injury to the roadway, adjacent property, or other streets or highways will result from its use.

When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the contract, the Contractor is free to use any methods or equipment that is demonstrated to the satisfaction of the Director of Parks & Open Space will accomplish the contract work in conformity with the requirements of the contract.

When the contract specifies that the construction be performed by the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Director of Parks & Open Space. If the Contractor desires to use a method or type of equipment other than those specified in the contract, the Contractor may request authorization from the Director of Parks & Open Space to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and an explanation of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing construction work in conformity with contract requirements. If, after trial use of the substituted methods of equipment, the Director of Parks & Open Space determines that the work produced does not meet the contract requirements, the Contractor shall discontinue the use of the substitute methods or equipment and shall complete the remaining construction with the specified methods and equipment. The Contractor shall remove the deficient work and replace it with work of specified quality at no expense to the City, or take such other corrective action as directed by the Director of Parks & Open Space. No change will be made in basis of payment for the construction items involved nor in contract time as a result of authorizing a change in methods or equipment under these provisions.

108.06 Date for Completion. The Contractor shall have completed the work on or before the calendar date specified in the contract or on or before a later date determined as specified herein, otherwise the Director of Parks & Open Space shall proceed as provided in 108. 07 or 108. 08.

If the contract is revised in any material respect and it is determined that said revision will cause delay in the completion of the work, the Director of Parks & Open Space will postpone the completion date by the number of calendar days determined to be equitable. If the Contractor finds it impossible for reasons beyond the Contractor's control to complete the work by the date as specified or as extended in accordance with the provisions of this section, the Contractor at any time prior to the expiration of the contract time as extended, may make a written request to the Director of Parks & Open Space for an extension of time setting forth therein the reasons which will justify the granting of the Contractor's request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Director of Parks & Open Space finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, then an extension of the time for completion in such amount as the conditions justify may be granted.

The extended time for completion shall then be in full force and effect the same as though it were the original time for completion.

If the Director of Parks & Open Space should suspend the work in whole or in part as provided in 108. 03, the date for completion shall be postponed the number of days that the suspension directly or indirectly delays the completion of the work.

108.07 Liquidated Damages. For each calendar day that any work shall remain uncompleted after the contract completion date, the sum specified herein will be deducted from any money due the Contractor, not as a penalty but as liquidated damages; provided however, that due account shall be taken of any adjustment of the completion date granted under the provisions of 108. 06. If the proposal contains a special provision for liquidated damages it shall be used in lieu of the schedule contained herein.

The Contractor shall complete the work by the calendar date specified in the contract, or by a later date determined in accordance with 108. 06. Requests for extension of the completion date shall be in writing and shall be submitted to the Director of Parks & Open Space, prior to the calendar date set for completion in the proposal. Failure to request an extension of the completion date, in writing, prior to the calendar date set for completion in the proposal and/or per 108. 06, will AUTOMATICALLY cause the deduction of liquidated damages, as set forth in 108. 07 or the proposal, from all estimates due and payable to the Contractor after such completion date.

Permitting the Contractor to continue and finish the work or any part of it after the date fixed for its completion, or after the date to which completion may have been extended, will in no way operate as a waiver on the part of the City of any of its rights under the contract.

The Director of Parks & Open Space may waive such portions of the liquidated damages as may accrue after the work is in condition for safe and convenient use.

In addition to the amounts specified hereinafter for each calendar day after the completion date, the Contractor will be charged for all inspection services regardless of any extension of time granted, unless such charges are waived by the Director of Parks & Open Space.

SCHEDULE OF LIQUIDATED DAMAGES

Original Contract Amount (Total Amount of the Bid)		Amount of Liquidated Damages to be Deducted for Each Calendar Day of Overrun in Time
From More Than	To and Including	
\$ 0	\$ 25,000	\$ 100. 00
25,001	50,000	150. 00
50,001	100,000	200. 00
100,001	500,000	300. 00
500,001	1,000,000	500. 00
1,000,001	2,000,000	750. 00
2,000,001	5,000,000	1,000. 00
5,000,001	10,000,000	1,500. 00
Over \$10,000,001		2,000. 00

108.08 Cancellation of Contract. If the work to be done under this contract shall be abandoned by the Contractor; or if this contract shall be assigned or the work under this contract sub-let by the Contractor, otherwise than herein specified; or if before the completion of the work under this contract, the Contractor shall become financially unable to meet obligations or shall become bankrupt or shall make a general assignment for the benefit of the creditors or shall have a receiver appointed or to take charge of the Contractor's affairs or shall have the Contractor's property levied upon or taken in execution or under attachment; or if, at any time, the Director of Parks & Open Space shall be of the opinion that the performance of the contract is unnecessarily or unreasonably delayed or that the Contractor is violating any of the conditions or agreements of this contract, or is executing the same in bad faith or is not fulfilling the terms thereof, or is not making such progress in the execution of the work as to indicate its completion within the time specified in the contract, or within the time to which the completion of the contract may have been extended by the Director of Parks & Open Space, then the Director of Parks & Open Space, in the Director of Parks & Open Space's sole discretion and on behalf of the City, may at any time declare this contract or any portion thereof, terminated by serving a written notice upon the Contractor, a copy of which shall be given to the surety or the authorized agent of the surety.

Upon the service of such notice, the Contractor shall discontinue the work or such part thereof as the Director of Parks & Open Space shall designate. The surety may, at its option, assume this contract or that portion thereof on which the Director of Parks & Open Space has ordered the Contractor to discontinue work and proceed to perform the same and may, with the written consent of the Director of Parks & Open Space, sublet the work. However, the surety shall exercise its option, if at all, within two weeks after written notice to discontinue work has been served upon the Contractor and upon the surety or its authorized agent. The surety, in such event, shall take the Contractor's place in all respects and will be paid by the City for all work performed by it in accordance with the terms of this contract and if the surety, under the provisions hereof, shall assume said entire contract, all monies remaining due the Contractor at the time of default shall thereupon become due and payable to the surety as the work progresses, subject to all of the terms of this contract.

In the event the Director of Parks & Open Space has ordered the Contractor to discontinue work on the project, the City shall have the absolute right, without liability on the part of the City to the Contractor or its surety, to continue and complete the project herein described. The surety and the Contractor shall then be jointly and severally liable for all expenditures made by the City to complete the said project excepting and providing that the surety shall not be liable for any amount over the obligation of its bond.

Any and all balances of payments due the Contractor by the City shall be forfeited to the City and the Contractor agrees that it shall lose all right, title and interest to said balances, excepting and providing that said balances shall be used, after forfeiture, for a set off to the benefit of the Contractor and its surety on the expenditures of the City to complete this project.

108.09 Certified Payroll. The Contractor shall submit to the Prevailing Wage Coordinator of the City a weekly copy of all project employee payrolls for the duration of the time of construction. The copy shall be accompanied by a certified statement, signed by the Contractor or an agent of the Contractor, indicating that the payrolls are correct and complete and that the wage rates contained therein are not less than those required by the prevailing wage rates in the contract, or any subsequent revision of wage rates during the life of the contract. The Contractor shall be responsible for the submission of copies of payrolls of all subcontractors.

The Contractor shall make employment records available for inspection by authorized representatives of the City and will permit employees to be interviewed during working hours by these representatives.

All weekly payrolls shall contain or have attached the following:

- 1) the name and employer identification number of each employee;
- 2) the current address of the employee;
- 3) the job classification of the employee (same as shown on wage determination or provisional approval);

- 4) rate of pay;
- 5) hours worked each day and total for each week;
- 6) fringe payments and deductions made.

Failure to furnish and submit the above information as part of the required weekly Certified Payroll will be cause for the City to withhold the preparation of the monthly estimate. In the event of a violation of the wage rate provisions by the Contractor or any subcontractor, the City may, after notice to the Contractor, suspend further payments or proceed to terminate the contract as provided by other sections of the contract.

109. - ACCEPTANCE, MEASUREMENT AND PAYMENT

- 109.01 Measurement of Quantities**
- 109.02 Scope of Payment**
- 109.03 Compensation for Altered Quantities**
- 109.04 Extra and Force Account Work**
- 109.05 Eliminated Items**
- 109.06 Partial Payments**
- 109.07 Payment for Material on Hand**
- 109.08 Final Inspection and Acceptance**
- 109.09 Final Estimate**
- 109.10 Release of Liability**
- 109.11 Guarantee**

109.01 Measurement of Quantities. Where work is to be paid for by units of length, area, weight or volume, all work accepted under this contract will be measured by the Director of Parks & Open Space, and the quantities of various items of work performed will be determined by the Director of Parks & Open Space, as the basis for final settlement.

For the calculation of quantities in which the computation of area by geometric methods would be comparatively laborious, it is stipulated and agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas.

109.02 Scope of Payment. The Contractor shall receive and accept compensation provided in the contract as full payment for furnishing all materials and equipment for performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof, except as otherwise provided in 104. 02, 105. 22 and 107. 14.

If the "Basis of Payment" clause in the specifications relating to any unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured or paid under any other pay item which may appear elsewhere in the specifications.

109.03 Compensation for Altered Quantities. When the accepted quantities of work vary from the quantities in the bid schedule, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract unit prices for the accepted quantities of work done. No allowance except as provided in 104. 02 will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense on the part of the bidder and subsequent loss of expected reimbursements therefor or from any other cause.

Increased work involving supplemental agreements shall be paid for as stipulated in such agreements. The Contractor shall furnish substantiating data required in the preparation of these agreements. The costs of increased work shall be developed using guidelines of 109. 04.

109.04 Extra and Force Account Work. Extra work performed in accordance with the requirements and provisions of 104. 03 will be paid for at the unit prices or lump sum stipulated in the order authorizing the work, or the City may require the Contractor to do such work on a force account basis to be compensated in the following manner:

(a) Labor. For all labor and for all foremen in direct charge of the specific operations, the Contractor shall receive the rate of wage and fringe benefits currently in effect at the time the work is performed for each and every hour that said labor and foremen are actually engaged in such work, to which may be added an amount equal to thirty percent of the sum thereof. The term fringe benefits shall be defined as the actual costs paid to, or in behalf of, workers by reason of health and welfare benefits, pension fund benefits or other benefits, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work. In addition to the above the Contractor shall receive the actual cost of Social Security Tax, Workers' Compensation and State and Federal Unemployment Insurance. In lieu of itemizing these four items, fifteen percent of the sum of wages and fringe benefits may be added.

The wages of any supervisor or timekeeper who is employed partly on force account work and partly in other work, shall be prorated between the two classes of work according to the number of men employed on each class of work as shown by the payrolls.

The Contractor shall receive the actual costs paid for subsistence and travel allowances when such payments are required by collectible bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work. No percentage may be added to these costs.

(b) Materials. For materials accepted by the Director of Parks & Open Space and used, the Contractor shall receive the actual cost of such materials delivered on the work, including transportation charges paid (exclusive of machinery rentals as hereinafter set forth), to which cost fifteen percent may be added.

8 Equipment. For machinery or special equipment other than small tools which it may be deemed necessary or desirable to use, the Contractor shall be allowed a rental price to be agreed upon in writing before such work is begun, for the time that such equipment is in use on the

work. No profit or overhead shall be added to any charges in connection with the use of owned equipment, however fifteen percent of the basic amount payable for rented equipment may be added for overhead and profit. Proper invoices will be required for rental equipment. The maximum rental price shall be as set forth in the current Equipment Guide Blue Book.

(d) Supervisor's Transportation. A flat hourly rate, which includes fuel and lubricants, profit and overhead, and any other costs will be allowed for the supervisor's transportation.

(e) Fuel and Lubricants. For all equipment except the supervisor's transportation (for which an all inclusive flat rate is allowed) fifteen percent of the basic equipment allowance may be added for cost of fuel and lubricants unless the Blue Book rate includes such fuel and lubricants.

(f) Subcontract Work. For work performed by an approved subcontractor the Contractor will be allowed an amount to cover administrative costs, equal to five percent of the compensation provided in (a), (b) (c), (d), and (e) but not exceeding \$5,000. 00.

(g) Compensation. The compensation to the Contractor as above provided in (a), (b), (c), (d), (e) and (f) shall constitute payment in full for extra work done on a force account including administrative, superintendence, overhead, use of tools and equipment for which no rental is allowed, profit, taxes other than sales tax, premium on insurance, and any other expense incidental to performing the force account work. Sales tax will not be allowed on any item for which tax exemption may be obtained.

(h) Statements. Final payment will not be made for work performed on a force account basis until the Contractor has furnished the Director of Parks & Open Space with quadruplicate itemized statements of the cost of such force account work detailed as follows:

- (1) Name, classification, date, daily hours, total hours, rate, and extension for each laborer and supervisor.
- (2) Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.
- (3) Quantities of materials, prices, and extensions.
- (4) Transportation of materials.

The Contractor's representative and the Director of Parks & Open Space shall compare records daily of the cost of work done as ordered on a force account basis. The Director of Parks & Open Space shall certify that these records are correct.

Statements shall be accompanied and supported by proper invoices for all materials used, transportation charges, and rented equipment performing work on force account operations. However, if materials used on the force account work are not specifically purchased for such work, but are produced by the Contractor or taken from the Contractor's stock, then in lieu of the invoices the Contractor shall furnish an affidavit certifying that such materials were produced by or taken from the Contractor's stock, that the quantity claimed was actually used, and that the

price and transportation claimed represent the actual cost to the Contractor. Statements shall be filed not later than the twentieth day of the month following that in which the work was actually performed.

The above described force account provisions will also apply to work performed at agreed unit prices and agreed lump sums when the agreed prices are based on analyses of cost of labor, material and equipment.

109.05 Eliminated Items. Should any items contained in the proposal be found unnecessary for the proper completion of the work, the Director of Parks & Open Space may, upon written order to the Contractor, eliminate such items from the contract, and such action shall in no way invalidate the contract. When the Contractor is notified of the elimination of items, the Contractor will be reimbursed for actual work done and all costs incurred, including mobilization of materials prior to said notification.

109.06 Partial Payments. On or about the first of each month, the Contractor shall prepare and submit to the Director of Parks & Open Space for approval, an estimate of the amount of labor performed and/or acceptable materials delivered to the site.

Progress payments shall be at the rate of ninety-two percent (92%) of the amount certified by the Director of Parks & Open Space until the work is fifty percent (50%) complete as determined by the Director of Parks & Open Space, from which time progress payments shall be at the rate of one hundred percent (100%) of the amount certified by the Director of Parks & Open Space with no further funds being retained.

When the project is substantially completed and occupied, or in use, or otherwise accepted, and there exists no other reason to withhold retainage, the retained funds shall be paid to the Contractor, withholding only that amount necessary to assure completion of the work. Retained funds shall be paid to the Contractor with interest thirty days from the date of final completion or either acceptance or occupancy by the City.

Partial payments may, at any time, be withheld, if in the opinion of the Director of Parks & Open Space, the work is not proceeding in accordance with the provisions of 108. 02.

Before the second partial payment estimate is processed and for each subsequent partial estimate thereafter, the Contractor will be required to submit a notarized affidavit confirming that all bills for materials and for subcontracted work represented by the previous partial payment have been paid. Should any defective work, material or acceptable work that has been damaged by the Contractor's operations be discovered previous to the final acceptance or should a reasonable doubt arise previous to the final acceptance as to the integrity of any part of the completed work, the estimate and payment for such defective or questioned work shall not be allowed until the defect has been remedied and cause for doubt removed, by and at the expense of the Contractor upon the order of the Director of Parks & Open Space.

109.07 Payment for Material on Hand. Partial payments may be made to the extent of the delivered cost of approved materials to be incorporated in the work, when delivered on the

project or stored in acceptable storage places in the vicinity of the project. Delivered cost shall be evidenced by manufacturer's invoices bearing the statement that all previous invoices have been paid.

The Contractor shall make application for payment for materials on hand or stored on forms provided by the Director of Parks & Open Space. Information will be required as to the cost of the materials, when such materials will be incorporated in the work and such other information which will be considered for approval of advanced payment. Consideration will only be given to materials for major items of the contract.

109.08 Final Inspection and Acceptance. When the Contractor completes all or portions of the work to be accepted by the City, a request for a final inspection by the Contractor shall be made. If items remain which must be completed or remedied by the Contractor, the Contractor shall perform the work immediately upon being notified by the Director of Parks & Open Space. When such items have been corrected by the Contractor, final inspection will be made. The work must pass final inspection before it will be accepted by the City.

Where the City has made a final inspection and has accepted any portion of the work, the retained percentage for the entire contract will be appropriately reduced for the portion of the work accepted.

109.09 Final Estimate. As soon as practicable after the acceptance of the work by the City, there shall be issued a final estimate for payment based on the actual quantities of completed and accepted work performed under this contract. Such final estimates shall be approved by the Director of Parks & Open Space, after which the City shall pay the entire sum found to be due, after deducting all previous payments made under 109.06. All prior estimates are subject to correction in the final estimate payment.

The date of approval of the final estimate by the Director of Parks & Open Space shall be the date of acceptance for the project.

109.10 Release of Liability. No person or corporation other than the signer of this contract as Contractor, has any interest hereunder and no claim shall be made or be valid, and neither the City, nor any official or agent thereof, shall be liable for or be held to pay any money except as provided herein. The acceptance by the Contractor of payment shall operate as and shall be a release to the City, and every officer and agent thereof, from all claims and liability to the Contractor for anything done or furnished for, or relating to the work, or for any act or neglect of the City, or of any person relating to or affecting the work.

109.11 Guarantee. When any work is accepted by the City there shall be a guarantee period extending for one year from the date of acceptance of the work. The City will designate on the plans or in the proposal those portions of the project which may be accepted prior to completion of the entire project. If during the course of the construction, the City desires to accept and place in operation any additional portions of the work, written notification will be given to the Contractor by the City.

At any time during the guarantee period, the City may notify the Contractor and his surety that certain repairs are necessary. Within ten days after being so notified, the Contractor shall make such repairs as are declared necessary to restore the work to a good and serviceable condition. Specifications for the work performed under this contract shall govern in the making of repairs under this section. In the event that the Contractor fails to comply with the order to repair as provided, said repairs may be made by the City and it is hereby agreed by the Contractor that reimbursement shall be made to the City for said expense so incurred within ten days following the receipt of a statement rendered to the Contractor by the City for said expense. Further, the Contractor will receive no recognition as a bidder for any future work of the City for a period of three years.

If the cost of providing security to the City for the one year guarantee period is prohibitive, the Contractor may, with approval of the Director of Parks & Open Space, make an assignment of bonds or other form of acceptable security to the City in the amount of five percent of the contract cost for the duration of the guarantee period.

PAYROLL INFORMATION

I, _____ (Name),
_____(Title) of _____
(Subcontractor/Contractor), state the following:

1. That I pay or supervise the payment of the persons employed by _____ (Subcontractor/Contractor) on the above-referenced project.

2. That during the payroll period commencing on the _____ day of _____, 2013, and ending on the _____ day of _____, 2013, all persons employed on said project have been paid the full weekly wages earned; that no rebates have been or will be made either directly or indirectly to or on behalf of said _____ (Contractor/Subcontractor) from the full weekly wages earned by such persons; and that no deductions have been made either directly or indirectly from the full wages earned by such persons, other than permissible deductions as defined in Regulations, Part 3 (29 CFR Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. 276c), and described below:

3. That any payrolls otherwise under this Agreement for Construction (the "Agreement") required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in the specifications as supplied by the Department of Industrial Relations or any wage determination incorporated into the Agreement; and that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

4. That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with the Ohio Apprenticeship Council.

5. That (check applicable box):

9 a. WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS:

In addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above-referenced payroll, payments of fringe benefits listed in the Agreement have been or will be made to appropriate programs for the benefit of such employees, except as noted in Section 48 below.

9 b. WHERE FRINGE BENEFITS ARE PAID IN CASH:

Each laborer or mechanic listed in the above-referenced payroll has been paid as indicated on the payroll, and amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the Agreement, except as noted in Section 48 below.

c. Exceptions:

Exception (Craft):

Explanation:

_____	_____
_____	_____
_____	_____
_____	_____

Remarks:

(Signature)

(Print Name and Title)

The willful falsification of any of the above statements may subject the Contractor or Subcontractor to fines as described in Section 4115.99 of the Ohio Revised Code.

FINAL PAYROLL AFFIDAVIT

STATE OF _____
COUNTY OF _____, SS:

I, _____ (Affiant),
_____ (Title) of _____
(Contractor/Subcontractor), do hereby certify that:

1. The Payroll Information reports submitted on behalf of (Contractor/Subcontractor) for this project are correct.
2. The wages paid to all employees for the full number of hours worked in connection with the Agreement for Construction (the "Agreement") for the above-referenced project during the period from _____ to _____ is in accordance with the prevailing wages prescribed by the Agreement.
3. No rebates or deductions for any wages due any person have been directly or indirectly made other than those provided by law.

(Signature of Affiant)

(Print Name)

Sworn to and subscribed in my presence this ___ day of _____, 2013.

Notary Public

The above affidavit must be executed and sworn to by the officer or agent or the Contractor/Subcontractor who supervised the payment of employees, before the City of Dublin, Ohio will release the surety and/or make final payment due under the terms of the Agreement.

SECTION 5 SPECIFICATIONS

SECTION 02 41 16
STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of buildings and site improvements.
 - 2. Removing below-grade construction.
 - 3. Disconnecting, capping or sealing, and abandoning in-place and removal of site utilities.
 - 4. Salvaging items for reuse by Owner.
- B. Related Sections:
 - 1. Division 01 Section "Summary" for use of the premises.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner. Include fasteners or brackets needed for reattachment elsewhere.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 SUBMITTALS

- A. Qualification Data: For qualified refrigerant recovery technician.
- B. Proposed Protection Measures: Submit informational report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
 - 1. Adjacent Buildings: When adjacent buildings are present on site, detail special measures proposed to protect buildings to remain including means of egress from those buildings.
- C. Schedule of Building Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.

3. Shutoff and capping, or re-routing of utility services.
- D. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- E. Pre-demolition Documentation: Show photographs or video, when the video process is approved in advance by the Architect, of existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Division 01. Submit photographs or video before the Work begins.
- F. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.
- D. Predemolition Conference: Conduct conference at Project site.
 1. Inspect and discuss condition of construction to be demolished.
 2. Review structural load limitations of existing structures.
 3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review and finalize protection requirements.
 5. Review procedures for noise control and dust control.
 6. Review procedures for protection of adjacent buildings when present.
 7. Review items to be salvaged and returned to Owner.

1.7 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Owner assumes no responsibility for buildings and structures to be demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 2. Before building demolition is scheduled to start, the Owner will remove the items they wish to retain and place them in storage.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
1. Hazardous materials will be removed by Owner before start of the Work.
 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. On-site storage or sale of removed items or materials is not permitted.
- 1.8 COORDINATION
- A. Arrange demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied buildings.

PART 2 - PRODUCTS (Not Used)

2.1 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Division 31 Section "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations. Comply with all Division 01 requirements.
- D. If life safety is compromised, engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
1. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 PREPARATION

- A. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.
- B. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.
 - 1. Owner will arrange to shut off indicated utilities when requested by Contractor.
 - 2. Arrange to shut off indicated utilities with utility companies.
 - 3. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 4. Cut off pipe or conduit a minimum of 24 inches (610 mm) below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- C. Existing Utilities: See Divisions 22, 26 & 33 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- D. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of demolition.
- E. Salvaged Items: The Owner will remove from the property items that they want to retain prior to the scheduled start of demolition.
 - 1. There are no items scheduled to be salvaged and reused as part of the construction of the new work of this project.

3.3 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Division 01 Section "Temporary Facilities And Controls."
 - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings and neighborhoods.
- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.4 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 2. Maintain fire watch during and for at least 4 hours after flame cutting operations.
 3. Maintain adequate ventilation when using cutting torches.
 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Engineering Surveys: During demolition, perform surveys to detect hazards that may result from building demolition activities.
- C. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- D. Explosives: Use of explosives is not permitted.

3.5 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Salvage: Items to be removed and salvaged by the Owner.

- D. Below-Grade Construction: Demolish foundation walls and other below-grade construction that are within footprint of new construction and extending 5 feet (1.5 m) outside footprint indicated for new construction. Abandon below-grade construction outside this area.
 - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely in areas indicated for new buildings.
- E. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.
 - 1. Piping: Disconnect piping at unions, flanges, valves, or fittings.
 - 2. Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.

3.6 DEMOLITION BY EXPLOSIVES

- A. Explosives: Do not perform explosive demolition.

3.7 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations and over excavation required for removal of bad soils. Back fill with engineered fill materials according to backfill requirements in Division 31 Section - Earth Moving and the requirements of the "S" series and the "C" series drawings.
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.8 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.9 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and legally dispose of them in an approved landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials accumulate on-site unless they are schedule for reuse.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn demolished materials.

3.10 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
 - 1. Clean roadways of debris caused by debris transport.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Cast-in place concrete, including formwork, reinforcement, concrete materials, accessories mix design, placement procedures, and finishes.
- B. Related Sections:
 - 1. Division 33- Utilities
 - 2. Section 32 13 13 – Concrete Pavement
 - 3. Section 05 50 00 - Metal Fabrications
 - 4. Section 07 10 00– General Waterproofing
 - 5. Section 07 92 00 - Joint Sealants

1.02 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.03 SUBMITTALS

- A. Product Data:
 - 1. Submit "Letter of Conformance" in accordance with Section 01 33 00 indicating specified items selected for use in project.
- C. Design Mixes: For each concrete mix, refer to sheet S-100 for Mixes. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- D. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures. Coordinate built-in items including anchor bolts, plates and clips.
- E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.
- F. Welding Certificates: Copies of certificates for welding procedures and personnel.
- G. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
- H. Material Certificates: Submit "Letter of Conformance" in accordance with Section 01 33 00 indicating specified items selected for use in project.
 - 1. Cementitious materials and aggregates.
 - 2. Form materials and form-release agents.
 - 3. Steel reinforcement and reinforcement accessories.

4. Fiber reinforcement.
5. Admixtures.
6. Waterstops.
7. Curing materials.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Epoxy joint filler.
13. Joint-filler strips.
14. Repair materials.

- I. Minutes of preinstallation conference.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer with a minimum of five years experience, who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.
 1. Manufacturer must be certified according to the [National Ready Mixed Concrete Association's \(NRMCA\)](#) "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- F. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
 1. [ACI](#) 301, "Specification for Structural Concrete."
 2. [ACI](#) 117, "Standard Specifications for Tolerances for Concrete Construction and Materials."
 3. [ACI](#) 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete".
 4. [ACI](#) 212 "Chemical Admixtures for Concrete"
 5. [ACI](#) 214R "Evaluation of Strength Test Results of Concrete"
 6. [ACI](#) 301 "Standard Specification for Structural Concrete"
 7. [ACI](#) 302 "Guide for Concrete Floor and Slab Construction"

8. [ACI](#) 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete".
 9. [ACI](#) 305R "Hot Weather Concreting".
 10. [ACI](#) 306R "Cold Weather Concreting".
 11. [ACI](#) 308 "Standard Practice for Curing Concrete"
 12. [ACI](#) 309R "Guide for Consolidation of Concrete".
 13. [ACI](#) 311.4R "Guide for Concrete Inspection".
 14. [ACI](#) 318 "Building Code Requirements for Structural Concrete".
 15. [ACI](#) 347R "Guide to Formwork for Concrete".
 16. [ACI](#) SP-66 "ACI Detailing Manual".
- G. Other Publications. Comply with the following, unless more stringent provisions are indicated:
1. CRSI-WCRSI "Placing Reinforcing Bars"
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section - "Administrative and Coordination."
1. Before submitting design mixes, review concrete mix design and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixes.
 - c. Ready-mix concrete producer.
 - d. Concrete subcontractor.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 PRODUCTS

2.01 FORM-FACING MATERIALS

- A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- B. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

2.02 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615, Grade 60, deformed.
- B. Plain-Steel Welded Wire Fabric: ASTM A185, fabricated from as-drawn steel wire into flat sheets.

2.03 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
- B. Tie Wire: Minimum 16 gage annealed type.

2.04 CONCRETE MATERIALS

- A. Portland Cement: [ASTM C150, Type I](#).
- B. Portland Cement: [ASTM C150, Type II](#).
 - 1. Fly Ash: [ASTM C618](#), Class C or F.
 - 2. Ground Granulated Blast-Furnace Slag: [ASTM C989](#), Grade 100 or 120.
- C. Normal-Weight Aggregate: ASTM C33, uniformly graded, and as follows:
 - 1. Class: Severe weathering region, but not less than 3S.
 - 2. Nominal Maximum Aggregate Size: 3/4 inch.
- D. Water: Potable and complying with ASTM C94.

2.05 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C260.
- C. Water-Reducing Admixture: ASTM C494, Type A.
- D. High-Range, Water-Reducing Admixture: ASTM C494, Type F.
- E. Water-Reducing and Accelerating Admixture: ASTM C494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C494, Type D.
- G. Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
 - 1. Approved Manufacturers:
 - a. "Catexol 1000CL"; [Axim Italcementi Group, Inc.](#) (800-899-8795)
 - b. "MCI 2000 or MCI 2005"; [Cortec Corporation](#) (800-426-7832)
 - c. "DCI or DCI-S"; [W. R. Grace & Co., Construction Products Div.](#) (800-778-2880)
 - d. "Rheocrete 222+"; [BASF Admixture Group](#) (216-839-7000)
 - e. "FerroGard-901"; [Sika Construction Products Division, Sika Corporation](#) (800-933-7452)
 - f. "Eucon CIA"; [Euclid Chemical Co, An RPM Company](#); (800-321-7628)

2.06 WATERSTOPS

- A. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
 - 1. Profile: Ribbed with center bulb.
- B. Approved Manufacturers:
 - 1. PVC Waterstops:
 - a. "PVC Waterstop"; [Greenstreak, Inc.](#); (800-325-9504)
 - b. "Sealtight PVC Waterstops"; [W. R. Meadows, Inc.](#); (800-342-5976)
 - c. [Westec Barrier Technologies; Div. of Western Textile Products, Inc.](#), (800-793-7832)

2.07 VAPOR RETARDERS

- A. Refer to Section 07 10 00 for [vapor barrier](#) materials.
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D448, Size 57, with 100 percent passing a 1-1/2-inch (38-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

2.08 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
 1. Material shall become an integral part of concrete surface and leave floor free of residue or film. Products shall be compatible with floor finish adhesives.
 2. Approved Manufacturers:
 - a. "Eucobar"; [Euclid Chemical Co, An RPM Company](#); (800-321-7628)
 - b. "Confilm"; [BASF Building Systems](#) (800-433-9517)
 - c. "SikaFilm"; [Sika Construction Products Division, Sika Corporation](#) (800-933-7452)
 - d. "Cimfilm"; [Axim Italcementi Group, Inc.](#) (800-899-8795)
 3. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- B. Moisture-Retaining Cover: ASTM C171, .006 inch (6 mil) thick, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B.
 1. Approved Manufacturers:
 - a. "High Seal"; [Conspec Marketing & Manufacturing Co., Inc., A Dayton Superior Brand.](#); (800-348-7351)
 - b. "Aqua Cure VOX"; [Euclid Chemical Co, An RPM Company](#); (800-321-7628)
 - c. "Glazecote 20"; [Lambert Corp](#) (800-432-4746)
 - d. "Kure-N-Seal WB"; [BASF Building Systems](#) (800-433-9517)
 - e. "Clearseal WB 150"; [Euclid Chemical Co, An RPM Company](#); (800-321-7628)
 - f. "Masterkure 200W", [BASF Building Systems](#) (800-433-9517)
 - g. "Kure 200W"; [Sonneborn Brand of BASF Building Systems](#) (800-433-9517)
- E. Clear, Waterborne, Curing and Sealing Compound: [ASTM](#) C1315, 25% solids minimum.
 1. Approved Manufacturers:
 - a. "Conspec #1-30"; [Conspec Marketing & Manufacturing Co., Inc., A Dayton Superior Brand.](#); (800-348-7351)
 - b. "Super Aqua Cure VOX"; [Euclid Chemical Co, An RPM Company](#); (800-321-7628)
 - c. "Glazecoat 30"; [Lambert Corp](#) (800-432-4746)
 - d. "Clearseal WB 300"; [Euclid Chemical Co, An RPM Company](#); (800-321-7628)
 - e. "Kure 1315"; [Sonneborn Brand of BASF Building Systems](#) (800-433-9517)

2.09 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber, or ASTM D1752, cork or self-expanding cork.
- B. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D2240.
- C. Polyurea Joint Filler: Two-component, 100 percent solids, with a Shore A hardness of 80 per [ASTM D2240](#).
- D. Bonding Agent: ASTM C1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- E. Epoxy-Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
 - 1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.

2.10 REPAIR MATERIALS

- A. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm).
 - 1. Cement Binder: ASTM C150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5700 psi (39 MPa) at 28 days when tested according to ASTM C109/C109M.

2.11 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Proportion concrete mix for each class of concrete to achieve the strengths (28 days) and slumps noted on the drawings.
- D. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.
- E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 25 percent.
 - 2. Combined Fly Ash and Pozzolan: 25 percent.
 - 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 - 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
- F. Maximum Water-Cementitious Materials Ratio: 0.50 for concrete required to have low water permeability.

- G. Maximum Water-Cementitious Materials Ratio: 0.40 for concrete exposed to deicers or subject to freezing and thawing while moist.
- H. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
 - 1. Air Content: 6 percent for 3/4-inch- (19-mm-) nominal maximum aggregate size.
- I. Do not air entrain concrete to trowel-finished interior floors. Do not allow entrapped air content to exceed 3 percent.
- J. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- K. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.12 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94 and ASTM C1116, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch (3 mm).
 - 2. Class B, 1/4 inch (6 mm).
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
 - 1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Chamfer exterior corners and edges of permanently exposed concrete unless otherwise noted or detailed on drawings.

- H. Form openings, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor bolts, accurately located, to elevations required.
- B. Embedded items shall be located so as not to reduce the strength of the construction. They shall be thoroughly clean and free from coating, rust, scale, oil and other foreign material. No wood shall be permanently embedded in concrete.
- C. Embedments shall be maintained in position and protected until the concreting is complete.

3.03 VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Place, protect, and repair vapor-retarder sheets according to [ASTM E1643](#) and manufacturer's written instructions.
- B. Refer to Section 07 10 00 for vapor barrier for additional specifications.

3.04 STEEL REINFORCEMENT

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

3.05 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

- C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.06 WATERSTOPS

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

3.07 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Owner's Representative.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
 - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.08 FINISHING SLABS

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes.
 - 1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
 - 2. Finish and measure surface so gap at any point between concrete surface and an unlevelled freestanding 10-foot- (3.05-m-) long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed 3/16 inch (4.8 mm).

- E. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Owner's Representative before application.

3.09 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Curbs: Other than specified in Section 32 13 13 Cement Concrete Pavement, provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.10 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
- a. Restrictions on use: Do not use curing compound on surfaces over which homogeneous sheet material will be applied. For surfaces to receive other finishes, submit well in advance of time for curing application, written acceptance of curing compound by both the manufacturer and the installer of the finish material, relative to compatibility therewith of finish material, including primers, adhesives, and similar materials. If manufacturer of finish material has not been determined, Contractor shall be responsible for coordinating such acceptance.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid epoxy joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Owner's Representative. Remove and replace concrete that cannot be repaired and patched to Owner's Representative approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.
- C. Repairing Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- D. Perform structural repairs of concrete, subject to Owner's Representative's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Owner's Representative's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 2. Slump: ASTM C143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C231, pressure method, for normal-weight concrete; ASTM C173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 5. Unit Weight: ASTM C567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

6. When frequency of testing will provide fewer than five compressive-strength tests
Compression Test Specimens: ASTM C31/C31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
 - a. Cast and field cure one set of four standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C39; test two laboratory-cured specimens at 7 days and two at 28 days.
 - a. Test one field-cured specimens at 7 days and two at 28 days, hold remaining pour in cylinder.
 - b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- E. Test results shall be reported in writing to [Owner's Representative](#), concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by [Owner's Representative](#) but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by [Owner's Representative](#). Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42 or by other methods as directed by [Owner's Representative](#).

END OF SECTION

SECTION 03 33 10
ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes interior cement concrete pavement for the following:
 - 1. Broom finish concrete floor at maintenance room.
 - 2. "Buff Wash" concrete at restrooms.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Qualification Data: For Installer.
- D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.
 - 4. Curing compounds.
 - 5. Joint fillers.
- F. Field quality-control test reports.
- G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- E. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.
 - 1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Owner's Representative.
 - 2. Notify Owner's Representative seven days in advance of dates and times when mockups will be constructed.
 - 3. Obtain Owner's Representative's approval of mockups before starting construction.
 - 4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
 - 5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
 - 1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:
 - a. Contractor's superintendent.
 - b. Concrete pavement subcontractor.

1.6 PROJECT CONDITIONS

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.

3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 1. Use flexible or curved forms for curves with a radius 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- D. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.
- E. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.
- F. Plain Steel Wire: ASTM A 82, as drawn
- G. Deformed-Steel Wire: ASTM A 496.
- H. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.
- I. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- J. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use one of the following cementitious materials, of the same type, brand, and source throughout the Project:
 1. Portland Cement: ASTM C 150, Type I, Gray, Supplement with the following:

- a. Fly Ash: ASTM C 618, Class F.
 2. Retain subparagraph below if factory-blended hydraulic cement is permitted; verify availability of options
- B. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate, uniformly graded. Provide aggregates from a single source.
1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
- C. Exposed Aggregate: Selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate as follows:
1. Aggregate Sizes: 1/2 to 3/4 inch nominal.
- D. Water: ASTM C 94/C 94M.
- E. Air-Entraining Admixture: ASTM C 260.
- F. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
1. Available Products:
 - a. Axim Concrete Technologies; Cimfilm.
 - b. Burke by Edeco; BurkeFilm.
 - c. ChemMasters; Spray-Film.
 - d. Conspec Marketing & Manufacturing Co., Inc.; Aquafilm.
 - e. Dayton Superior Corporation; Sure Film.
 - f. Euclid Chemical Company (The); Eucobar.
 - g. Kaufman Products, Inc.; Vapor Aid.
 - h. Lambert Corporation; Lambco Skin.
 - i. L&M Construction Chemicals, Inc.; E-Con.
 - j. MBT Protection and Repair, ChemRex Inc.; Confilm.
 - k. Meadows, W. R., Inc.; Sealtight Evapre.

- l. Metalcrete Industries; Waterhold.
 - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
 - n. Sika Corporation, Inc.; SikaFilm.
 - o. Symons Corporation; Finishing Aid.
 - p. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.
- E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- 1. Available Products:
 - a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
 - b. Burke by Edoko; Aqua Resin Cure.
 - c. ChemMasters; Safe-Cure Clear.
 - d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
 - e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
 - f. Euclid Chemical Company (The); Kurez DR VOX.
 - g. Kaufman Products, Inc.; Thinfilm 420.
 - h. Lambert Corporation; Aqua Kure-Clear.
 - i. L&M Construction Chemicals, Inc.; L&M Cure R.
 - j. Meadows, W. R., Inc.; 1100 Clear.
 - k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
 - l. Symons Corporation; Resi-Chem Clear.
 - m. Tamms Industries Inc.; Horncure WB 30.
 - n. Unitex; Hydro Cure 309.
 - o. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1752, cork or self-expanding cork.
- B. Color Pigment (Alternate): ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
 - 1. Available Manufacturers:
 - a. Davis Colors.
 - b. Scofield, L. M. Company.
 - c. Solomon Colors.
 - 2. Color: Match Owner's Representative's sample and as selected and approved by Owner's Representative.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Chemical Surface Retarder (Alternate): Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

1. Available Products:
 - a. Burke by Edeco; True Etch Surface Retarder.
 - b. ChemMasters; Exposee.
 - c. Conspec Marketing & Manufacturing Co., Inc.; Delay S.
 - d. Euclid Chemical Company (The); Surface Retarder S.
 - e. Kaufman Products, Inc.; Expose.
 - f. Metalcrete Industries; Surfard.
 - g. Nox-Crete Products Group, Kinsman Corporation; Crete-Nox TA.
 - h. Scofield, L. M. Company; Lithotex.
 - i. Sika Corporation, Inc.; Rugasol-S.
 - j. Vexcon Chemicals, Inc.; Certi-Vex Envioset.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 1. Compressive Strength (28 Days): 4000 psi.
 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
 3. Slump Limit: 4 inches plus or minus 1 inch.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 1. Air Content: 4-1/2 percent plus or minus 1.5 percent for 1-1/2-inch nominal maximum aggregate size.
- D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals. as follows:
 1. Fly Ash or Pozzolan: 25 percent.
 2. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.
- F. Color Pigment (Alternate): Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
 2. Subbase with soft spots and areas of pumping or rutting exceeding depth of **1/2 inch** require correction according to requirements in Division 2 Section "Earthwork."
- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 - 2. Provide tie bars at sides of pavement strips where indicated.
 - 3. Butt Joints: Use epoxy bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of 30 feet unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Control Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows to match drawings:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks. Align sawed joints with drain inlets as indicated on the drawings.

3.6 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site.
- F. Do not add water to fresh concrete after testing.
- G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- I. Screed pavement surfaces with a straightedge and strike off.
- J. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- K. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- L. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 SPECIAL FINISHES

- A. "Buff Wash" or Monolithic Lightly Exposed-Aggregate Finish: Expose aggregate in pavement surfaces as follows:
 1. Place only the amount of concrete that can be finished in a single day due to the critical timing aspects of this type of finish. Adjust the finishing procedures for weather conditions of each day i.e. sunny, cloudy, warm, cool, windy, high humidity, etc.)
 2. Trowel finish with a "Sweet Trowel". Allow to set approximately 2 to 3 hours or until you can see a little shadowing of the aggregates before beginning power washing.
 3. Power wash surface in at least two directions confirming the force of the power washing is providing the desired finish per sample mock-up. A uniform non-directional finish is the finish that is desired.
 4. If needed, lightly brushing the surface with a stiff, nylon-bristle broom during power washing may be utilized.

3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 - 1. Elevation: 1/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/4 inch.
 - 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
 - 5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
 - 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
 - 8. Joint Spacing: 3 inches.
 - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 - 10. Joint Width: Plus 1/8 inch, no minus.

3.11 FIELD QUALITY CONTROL

- A. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least 1 composite sample for each 5000 sq. ft. or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- B. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- C. Test results shall be reported in writing to Owner's Representative, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Owner's Representative but will not be used as sole basis for approval or rejection of concrete.
- E. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Owner's Representative.
- F. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.12 REPAIRS AND PROTECTION
- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
 - B. Drill test cores, where directed by Owner's Representative, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

SECTION 04 22 00
CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Decorative concrete masonry units.
 - 3. Mortar and grout.
 - 4. Steel reinforcing bars.
 - 5. Masonry joint reinforcement.
 - 6. Ties and anchors.
 - 7. Embedded flashing.
 - 8. Miscellaneous masonry accessories.
 - 9. Masonry-cell insulation.
- B. Related Sections:
 - 1. Division 03 Section "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.
 - 2. Division 05 Section "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural-steel frame.
 - 3. Division 07 Section "Water Repellents" for water repellents applied to concrete unit masonry.
 - 4. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
 - 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

1.5 SUBMITTALS

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

- B. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
 - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

- C. Samples for Initial Selection:
 - 1. Decorative CMUs, in the form of small-scale units.
 - 2. Colored mortar.
 - 3. Weep holes/vents.

- D. Samples for Verification: For each type and color of the following:
 - 1. Decorative CMUs.
 - 2. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
 - 3. Accessories embedded in masonry.

- E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
 - 1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

- F. Qualification Data: For testing agency.

- G. Material Certificates: For each type and size of the following:
 - 1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 - 2. Cementitious materials. Include brand, type, and name of manufacturer.
 - 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - 4. Grout mixes. Include description of type and proportions of ingredients.
 - 5. Reinforcing bars.
 - 6. Joint reinforcement.
 - 7. Anchors, ties, and metal accessories.

- H. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 - 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

- I. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

- J. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- E. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.
 - 1. Build sample panels for typical exterior and interior walls in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness.
 - 2. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
 - 3. Protect approved sample panels from the elements with weather-resistant membrane.
 - 4. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.
- F. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Regional Materials: Provide CMUs that have been manufactured within 500 miles (800 km) of Project site from aggregates that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged, and bullnose, units for outside corners as indicated on the drawings.
- C. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) ACM Chemistries, Inc.; RainBloc.
 - 2) BASF Aktiengesellschaft; Rheopel Plus.
 - 3) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.
- D. CMUs: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi (19.3 MPa).
 2. Density Classification: Normal weight.
 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
- E. Concrete Building Brick: ASTM C 55.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi (19.31 MPa).
 2. Density Classification: Normal weight.
 3. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.
- F. Decorative CMUs: ASTM C 90.
1. Ground Face CMU: "Trendstone" by Trenwyth Industries, Inc., or approved equal prior to bidding. Units meeting requirements of "Concrete Unit Masonry Block" above with exposed faces ground.
 - a. Provide half-depth single-faced units instead of full-depth double-face unit where both sides exposed in same room.
 - b. Colors: Refer to Room Finish Legend and Schedule.
 - c. Provide trim and shapes required for conditions.
 - d. Water Repellent: Units to be manufactured with W.R. Grace Dryblock water repellent mortar admixture.
 2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi (19.3 MPa).
 3. Density Classification: Normal weight.
 4. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph and as indicated on the drawings.
 5. Pattern and Texture: Standard pattern, ground-face finish.
- ### 2.3 MASONRY LINTELS
- A. General: Provide one of the following:
- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Provide aggregate for mortar and grout that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C 91.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cemex S.A.B. de C.V..
 - b. Lafarge North America Inc..
 - c. Lehigh Cement Company.
 - d. National Cement Company, Inc.
- F. Mortar Cement: ASTM C 1329.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Lafarge North America Inc.; Lafarge Mortar Cement.
- G. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Solomon Colors, Inc.; SGS Mortar Colors.
- H. Colored Cement Product: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Colored Portland Cement-Lime Mix:
 - 1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
 - 2) Lafarge North America Inc.; Eaglebond Portland & Lime.
 - 3) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
 - 2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - 3. Pigments shall not exceed 10 percent of portland cement by weight.
- I. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- J. Aggregate for Grout: ASTM C 404.

- K. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Euclid Chemical Company (The); Accelguard 80.
 - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
 - c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.
- L. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ACM Chemistries, Inc.; RainBloc for Mortar.
 - b. BASF Aktiengesellschaft; Rheopel Mortar Admixture.
 - c. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
- M. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
1. Interior Walls: Hot-dip galvanized, carbon steel.
 2. Exterior Walls: Hot-dip galvanized, carbon steel.
 3. Wire Size for Side Rods: 0.187-inch (4.76-mm) diameter.
 4. Wire Size for Cross Rods: 0.187-inch (4.76-mm) diameter.
 5. Wire Size for Veneer Ties: 0.187-inch (4.76-mm) diameter.
 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
 7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
 2. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.
 3. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 4. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire.
 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.

- C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch- (1.52-mm-) thick, steel sheet, galvanized after fabrication.
 - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
- D. Partition Top anchors: 0.105-inch- (2.66-mm-) thick metal plate with 3/8-inch- (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.
 - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

2.7 MISCELLANEOUS ANCHORS

- A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.
- B. Dovetail Slots in Concrete: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch (0.86-mm), galvanized steel sheet.
- C. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- D. Postinstalled Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 - 1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.40 mm) thick.
 - 2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. (4.9-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. (3.7-kg/sq. m) weight or 0.0162 inch (0.41 mm) thick.
 - 3. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
 - 4. Fabricate through-wall metal flashing embedded in masonry from copper, with ribs at 3-inch (76-mm) intervals along length of flashing to provide an integral mortar bond.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Cheney Flashing Company;
 - 2) Keystone Flashing Company, Inc
 - 3) Sandell Manufacturing Co., Inc.

5. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
 6. Fabricate metal drip edges for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches (76 mm) into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
 7. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
 8. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:
1. Copper-Laminated Flashing: 7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded between 2 Asphalt-Coated Copper Flashing: 7-oz./sq. ft. (2-kg/sq. m) copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products Inc.; Cop-R-Cote.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Coated Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
 - 4) Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.
 - 5) Sandell Manufacturing Co., Inc.; Coated Copper Flashing.
 2. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch (1.02 mm).
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier Thru-Wall Flashing.
 - 3) Grace Construction Products, W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
 - 4) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
 - 5) Hohmann & Barnard, Inc.; Textroflash.
 - 6) W. R. Meadows, Inc.; Air-Shield Thru-Wall Flashing.
 - 7) Sandell Manufacturing Co., Inc.; Sando-Seal.
 3. Accessories: Provide preformed corners, end dams, other special shapes, and layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products Inc.; Copper Fabric Flashing.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
 - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
 - 5) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
 - 6) York Manufacturing, Inc.; Multi-Flash 500.
 - b. Seaming materials produced by flashing manufacturer.
 2. Copper-Laminated Flashing: 7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded between 2 Asphalt-Coated Copper Flashing: 7-oz./sq. ft. (2-kg/sq. m) copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products Inc.; Cop-R-Cote.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Coated Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
 - 4) Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.
 - 5) Sandell Manufacturing Co., Inc.; Coated Copper Flashing.
 2. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch (1.02 mm).
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier Thru-Wall Flashing.
 - 3) Grace Construction Products, W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
 - 4) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
 - 5) Hohmann & Barnard, Inc.; Textroflash.
 - 6) W. R. Meadows, Inc.; Air-Shield Thru-Wall Flashing.
 - 7) Sandell Manufacturing Co., Inc.; Sando-Seal.
 3. Accessories: Provide preformed corners, end dams, other special shapes, and layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Advanced Building Products Inc.; Copper Fabric Flashing.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
 - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
 - 5) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
 - 6) York Manufacturing, Inc.; Multi-Flash 500.
 - b. Seaming materials produced by flashing manufacturer.
 3. Application: Unless otherwise indicated, use the following:
 1. Where flashing is indicated to receive counterflashing, use metal flashing.
 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge.
 4. Where flashing is fully concealed, use metal flashing or flexible flashing.

- D. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from high-density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging with mortar.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Sandell Manufacturing Co., Inc.; Blok-Flash.
- E. Solder and Sealants for Sheet Metal Flashings:
 - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 - 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
 - 3. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
 - 1. Products: Subject to compliance with requirements, provide products from one of the following manufacturers:
 - a. Dayton Superior Corporation, Dur-O-Wal Division..
 - b. Heckmann Building Products Inc.
 - c. Hohmann & Barnard, Inc.
- E. Masonry-Cell Insulation:
 - 1. Core Foam Masonry Foam Insulation (Foam-in-Place Building Insulation)
 - a. Formulation: Cellular plastic insulation comprised of a spray-dried polymeric resin and a foaming catalyst concentrate which are combined with water and then injected, along with compressed air, into the wall cavity by the installer.
 - 2. ASTM E-84 Surface Burning Characteristics:
 - a. Flame Spread: 25 or less
 - b. Smoke generated: less than 450
 - c. Thickness: 3.5 inches (maximum thickness allowed by test apparatus)

- d. Tests performed by an independent, certified laboratory located within the United States of America.
- e. Flammability Classification: Class A or Class I
3. Thermal Conductivity of foam insulation
 - a. k-value 0.20-0.25 BTU/(hr ft² °F in); 0.22, on average at 25 °F
 - b. R-Value 4.0-5.0 (hr ft² °F in)/BTU; 4.92 per inch at 25 °F
4. Shrinkage
 - a. 2 percent, maximum
5. Density of Foam:
 - a. Wet Foam 12x12x12 box weight: 2 ½ -3 ¼ lbs.
 - b. Upon final curing: 0.5-1.0 lb/ft³
6. Approved Manufacturers:

cfiFOAM, Inc., PO Box 10393, Knoxville, TN 37939.
Telephone: 800-656-3626. Fax: 865-588-6607.
Email: info@cfifoam.com. Website: www.cfifoam.com.

2.10 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. For exterior masonry, use portland cement-lime mortar.
 4. For reinforced masonry, use portland cement-lime mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 1. For masonry below grade or in contact with earth, use Type S.
 2. For reinforced masonry, use Type S.
 3. For mortar parge coats, use Type S or Type N.
 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 5. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
 1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Mix to match Architect's sample.

3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.

- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
 1. Mix to match Architect's sample.
 2. Application: Use colored aggregate mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.

- F. Grout for Unit Masonry: Comply with ASTM C 476.
 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
 3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.

- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.

- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).

3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches (50 mm). Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

- H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c. unless otherwise indicated.
 - 3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 MASONRY-CELL INSULATION

- A. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.7 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
 - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
 - 1. Provide an open space not less than 1/2 inch (13 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.9 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
 - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 - 2. Install preformed control-joint gaskets designed to fit standard sash block.
 - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
 - 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

3.10 LINTELS

- A. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.11 FLASHING

- A. General: Install embedded flashing in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At lintels, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
 3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
 4. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
 5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.12 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner may engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.
- B. Inspections will be in accordance with Level 1 of the "International Building Code."
1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- I. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.14 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch (19 mm). Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3 mm per 300 mm). Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.15 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.16 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."
 3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 04 23 00
GLASS UNIT MASONRY

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Glass Unit Masonry.
- B. Related Sections:
 - 1. Section 04 22 00 Concrete Unit Masonry.
 - 2. Section 07 92 00 Joint Sealants.

1.02 REFERENCE STANDARDS

- A. American Concrete Institute (ACI):
 - 530.1-95 Specification for Masonry Structures.(ACI 530.1-95/ASCE 6-95/TMS 602-95)
 - 530.1-99 Specification for Masonry Structures.(ACI 530.1-99/ASCE 6-99/TMS 602-99)

1.03 PERFORMANCE REQUIREMENTS

- A. The structure is designed to be self-supporting and stable after the building is fully completed. It is the Contractor's sole responsibility to determine erection procedure and sequence and to ensure stability of the building and its component parts during erection including the addition of any temporary bracing that might be necessary. Temporary bracing is not shown on the drawings. If used, it shall be removed as determined by the Contractor's erection procedure and remain the Contractor's property.

1.04 SUBMITTALS

- A. Submit in accordance with Division 1 requirements.
- B. Manufacturer's Data: Manufacturer's installation instructions and specifications. Include details applicable to condition.
- C. Shop Drawings: Show all details and dimensions required for use of full uncut units.
- D. Samples: Submit samples of each color, texture, and shape of glass masonry unit proposed for use on the work; obtain approval before proceeding.

1.05 QUALITY ASSURANCE

- A. Masonry construction and materials shall conform to all requirements of ACI 530.1 except as modified by this Section. Numbers in parentheses (0.00) indicate a related paragraph of ACI 530.1.
- B. Installer: Experienced in glass masonry workmanship of the highest quality, be regularly engaged in masonry construction, and have plant and personnel sufficient to complete the work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Storage: Store materials to prevent damage. Chipped, scratched or abraded units are not acceptable; do not use materials which, in the Architect's opinion, have become unsuitable. Stack all masonry units off ground and protect with nonstaining covering.

1.07 PROJECT CONDITIONS

- A. Environmental Conditions:
1. General: Comply with recommendations of IMIAWC.
 2. Temperature: See ACI 530.1
 - a. Adding of antifreeze ingredients is prohibited.
 - b. Wet finished, grouted brick surfaces only in hot weather when they may be fog sprayed to facilitate cure.
 3. Weather: In rainy weather, do work only under cover; take particular care to see that backing and substrate surfaces are dry and free from surface moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Specification based on products by Pittsburgh Corning Corp. Approved equal products are acceptable by the following manufacturers:
1. Forms & Surfaces.
 2. Westwald A.G. (Solaris) distributed by Sholton Assoc.

2.02 MATERIALS

- A. Masonry Units: Glass block by approved manufacturers.
1. Size: Nominal 8 inch x 8 inch face x 3-7/8 inch thick.
 2. Patterns: Selected by Architect from manufacturer's full range.
 - a. Typical unit: "Premier" Series Opal.
- B. Mortar: Specified elsewhere; obtain approval of mortar from glass block manufacturer.
- C. Accessories:
1. Expansion strips: 3/8 inch thick, dense fibrous glass batt; manufacturer's standard.
 2. Reinforcing: Welded ladder design galvanized wire; manufacturer's standard.
 - a. Deformed bars: Refer to Section 04085; provide in size shown on drawings.
 3. Panel Anchors: Steel, galvanized after fabrication.
 - a. Strip Type: 20 gage x 1-3/4 inch wide perforated strips.
 - b. Channel Type: 20 gage x 2 inch wide channel-shaped device with slotted holes to receive reinforcing.
 4. Miscellaneous: As required for complete installation.
 - a. Bent plates and perimeter framing; provided under Division 5.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive work under this Section before installation for defects or conditions adversely affecting quality and execution of the installation.
 - 1. Do not proceed with installation work until unsatisfactory conditions are corrected.
 - 2. Surfaces to be firm, dry, clean, and free of oily or waxy films or curing compounds.
 - 3. Electrical, Plumbing (including Fire Protection), and HVAC (including Building Automation) work in or behind masonry to be installed before proceeding with masonry work.
- B. Examine Units:
 - 1. Verify that moisture content is suitable for installation and that units are clean and undamaged.
 - 2. Cracked, chipped, or scratched units will not be accepted.
 - 3. Units visibly warped, out of square, or out of tolerances are not acceptable.

3.02 PREPARATION

- A. Cold Weather/Hot Weather: Provide as required by ACI 530.1.
- B. Protection: During inclement weather, do not start masonry work until suitable protection is provided. See PROJECT CONDITIONS in Part 1.
- C. Coordination:
 - 1. Obtain exact sizes of openings for ducts, grilles, piping, and other work furnished by other trades and properly build around same.
 - 2. Locate pipe and conduit in walls accurately and so as not to weaken strength of the masonry.
- D. Except as otherwise specified under PROJECT CONDITIONS, dampen brick before laying as required to control suction rate and to prevent excessive absorption affecting bond of mortar to unit. Allow excessively wet units to dry before laying.

3.03 LAYING MASONRY UNITS

- A. Installation Procedures and Sequence:
- B. Workmanship and Methods: In accordance with ACI 530.1 unless otherwise specified. Construction not covered by ACI 530.1 to comply with the applicable recommendations of the following:
 - 1. Brick Masonry: Tech Notes by BIA.
 - 2. Concrete Unit Masonry: TEK Bulletins of NCMA.
- C. Tolerances: Construct masonry work within the following non-cumulative tolerances:
 - 1. Variation From Plumb: For lines and surfaces of walls, not to exceed 1/4 inch in 10 feet or 3/8 inches in a story height.
 - 2. Variation From Level: For lines of exposed lintels, sills, and other conspicuous lines, not to exceed 1/4 inch in any bay or 20 feet, nor 3/4 inches in 40 feet or more.

3.04 ADJUSTING

- A. Remove and replace units which are loose, chipped, broken, stained, or otherwise damaged. Provide new units to match adjoining units and install in fresh mortar pointed to eliminate evidence of replacement.

- B. During tooling of joints, enlarge any voids or holes, except weeps, and completely fill with mortar. Point up all joints at corners, openings, and adjacent work to furnish a neat, uniform appearance, satisfactorily prepared for application of sealant.

3.05 DAILY PROCEDURES

- A. At end of each day's work:
 - 1. Dry brush exposed masonry.
 - 2. Remove mortar spots and droppings.
 - 3. Turn back toe boards on scaffolding to reduce mortar splashes on masonry from rain.
- B. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly (if required), and remove loose masonry units and mortar prior to laying fresh masonry.
- C. When work is not in progress, keep tops of walls covered with non-staining waterproof covering.
 - 1. Extend covering down on both sides of wall and secure in place; cover all work installed that day but not less than 24 inches below top of walls.
 - 2. When work is resumed, clean top surface of loose mortar and other foreign matter.

3.06 CLEANING

- A. See SEQUENCE AND SCHEDULING in Part 1 above.
- B. Clean exposed brick and CMU work in accordance with recommendations of BIA Technical Notes 20 Revised or NCMA TEK Bulletin 8-2 as applicable, for non-acid cleaning or mild acid cleaning using "Bucket and Brush" method where "High Pressure Water Cleaning" is not effective or may be detrimental to Work. See "Sample Panel" under QUALITY ASSURANCE in Part 1 above.
- C. Protect sash, louvers, and other corrodible parts. Strong acid cleaning is prohibited.
- D. Responsibility: Damage to Work caused by cleaning is the responsibility of work under this Section.
 - 1. Provide temporary seals acceptable to Architect and Division 7 sealant manufacturer where needed to protect interior Work. Remove temporary seals at completion of cleaning work; leave ready for installation of permanent seals specified elsewhere.
 - 2. Where temporary seals are not acceptable, nor effective, provide special hand procedures as needed to complete cleaning without damage to Work.

END OF SECTION

SECTION 04 73 00
MANUFACTURED STONE MASONRY

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Exterior Simulated Stone and Cap Stone

B. Related Sections:

1. Section 04 20 00 Concrete Masonry Units
2. Section 07 62 00 Sheet Metal Flashing and Trim
3. Section 07 92 00 Joint Sealants

1.02 DEFINITIONS

- A. Simulated Stone: Architectural precast stone units intended to simulate natural stone.

1.03 SYSTEM DESCRIPTION

- A. General: Fabricate and install simulated stone to withstand loads from wind, gravity, movement of building structure, and thermally induced movement, as well as to resist deterioration under conditions of normal use including exposure to weather, without failure.
- B. Provide hand-set (field-installed) anchoring system, including connections to building structure, that is capable of sustaining forces generated by gravity loads, wind loads, and stresses induced by thermal movement, acting separately or in combination, within the following parameters:

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of simulated stone, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Samples for verification purposes of simulated stone in form of sets for each color, grade, finish, type, and variety of simulated stone required.
1. Colored pointing mortar and grout samples for each color required showing full range of exposed color and texture to be expected in completed work.
- C. Shop Drawings detailing fabrication and installation of simulated stone cladding. Include setting drawings indicating sizes, dimensions, sections, profiles of stones and details of sloped stone walls, arrangement and provisions for jointing, supporting, anchoring, and bonding stonework, and details showing relationship with, attachment to, and reception of related work.
1. Include building elevations showing layout of units and locations of joints and anchors.
- D. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing simulated stone similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to manufacture required units.
- B. Single-Source Responsibility for Simulated stone: Obtain each color, grade, finish, type, and variety of stone from a single manufacturer with resources to provide materials of consistent quality in appearance and physical properties, including the capacity to mold and finish material without delaying the progress of the work.

- C. Single-Source Responsibility for Mortar and Grout Materials: Obtain mortar ingredients of uniform quality and from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.
- D. Single-Source Responsibility for Other Materials: Obtain each type of simulated stone accessory, sealant, and other materials from one manufacturer for each product.
- E. Installer Qualifications; Engage an experienced installer who has completed stone cladding similar in material, design, and extent to that indicated for project that has resulted in construction with a record of 5 years of successful in-service performance.
- F. Sample Panels: Before installing simulated stone, build sample panels, including all materials flashings, sheathing and sealants. Panel to represent complete construction. Materials shall be same as for the completed work. Panels to verify selection and product aesthetic effects. Build sample panels for each type of exposed simulated stone assembly in sizes approximately 48 inches long by 48 inches high by full thickness.
 - 1. Locate panels in the locations indicated or, if not indicated, as directed by the Architect.
 - 2. Build mock-ups for the following types of dimension stonework:
 - a. Typical exterior simulated stone of each type, full size in conjunction with mock-up for adjacent materials. Illustrate field pattern of stone and color and tooling of joints.
 - b. Mockups may be incorporated into the work. If not, retain mock-ups during construction as standard for judging completed dimensions stonework. When directed, demolish mock-ups and remove from site.
 - 3. Clean exposed faces of panels with masonry cleaner indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver simulated stone materials to project in undamaged condition in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store simulated stone on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
 - 1. Do not use pinch or wrecking bars.
 - 2. Lift with wide-belt-type slings where possible. Do not use wire rope or ropes containing tar or other substances that might cause staining. If required to move stone, use wood rollers with cushions at end of wood slides.
 - 3. Store simulated stone on wood skids or pallets covered with nonstaining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones.
 - 4. Protect cast stored stone from weather with waterproof, nonstaining covers or enclosures, but allow air to circulate around stones.
 - 5. Store cementitious materials off the ground, under cover, and in dry location.
 - 6. Do not use salt or calcium-chloride to remove ice from simulated stone surfaces.
- C. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.
- D. Store simulated stone accessories, including metal items, to prevent deterioration by corrosion and accumulation of dirt.

1.07 PROJECT/SITE CONDITIONS

- A. Protection of Work: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed simulated stone when construction is not in progress.

- B. Staining: Prevent grout, mortar, and soil from staining the face of simulated stone to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such simulated stone.
 - a. Protect base of walls from rain-splashed mud and from mortar splatter by means of coverings spread on ground and over wall surface.
- C. Environmental Requirements:
 - 1. Ambient air temperature shall be in accordance with manufacturer's requirements.
 - 2. Maintain materials and surrounding air temperature to minimum 40 degrees prior to, during, and for 48 hours after completion of work.
 - 3. Protect materials from rain, moisture, and freezing temperatures prior to, during, and after 48 hours after completion of work.
 - 4. Allow no construction activity on opposite side of wall during installation, and for 48 hours after completion of work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Approved Manufacturers:
 - 1. "Cultured Stone"; [Cultured Stone, Division of Owens Corning](#) (800-2551727)
 - 2. "Eldorado Stone"; [Eldorado Stone, A Headwaters Company](#) (800-925-1491)
 - 3. [Arriscraft](#) International, Inc. (800-265-8123)
 - 4. Pro Cast Stone (262-677-9810)
- B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01 25 00 - Substitution Procedures.
- C. Color and Pattern: Cultured Stone; Profit LedgeStone, Color: Platinum

2.02 ACCESSORIES

- A. Weather Resistant Barrier: Kraft waterproof building paper, UBC Standard 14-1.
- B. Metal Lath: 18 gauge galvanized woven wire mesh, or galvanized 2.5 lb. Flat diamond mesh.
- C. Flexible Flashing: As specified in Section 07 62 00.
- D. Fasteners: Min 7/16" (11.1mm) head diameter, corrosion-resistant self-drilling, self-tapping, pancake head screws of sufficient length to penetrate 3/8" (10mm) into the stud.

2.03 MORTAR AND GROUT MATERIALS

- A. Refer to manufacturers Standard Installation (Grouted Joints) instructions.
- B. Portland Cement: ASTM C150, Type I, of natural color or white, as needed to produce color indicated.
- C. Hydrated Lime: ASTM C207, Type S
- D. Aggregate: ASTM C144, and as indicated below:
 - 1. For joints narrower than 1/4 inch, use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent the No. 16 sieve.
 - 2. For pointing mortar, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 3. White Mortar Aggregates: Natural white sand or ground white stone.

2.04 SIMULATED STONE FABRICATION

- A. General: Fabricate simulated stone in sizes and shapes required to comply with requirements indicated, including details on Drawings and final Shop Drawings. Provide pre-manufactured corners for corner conditions.
- B. Carefully inspect finished stones at fabrication plant for compliance with requirements relative to qualities of appearance, material, and fabrication. Replace defective stones with ones that do comply.

2.05 MORTAR AND GROUT MIXES

- A. General: Comply with referenced standards and with manufacturers' instructions relative to mix proportions, mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality and with optimum performance characteristics.
 - 1. Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or calcium chloride, unless otherwise indicated.
 - 2. Mixing: Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer, unless otherwise indicated. Discard mortars and grout when they have reached their initial set.
- B. Portland Cement/Lime Setting Mortar for Nonpaving Installations: Comply with ASTM C 270, Proportion Specification, for types of mortars and stone indicated below:
 - 1. Set stone with Type N mortar. Color as selected by Architect.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive simulated stone work, and conditions under which materials will be installed, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of dimension stonework. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. For the record, prepare written report, endorsed by installer, listing conditions detrimental to performance of simulated stone work.

3.02 PREPARATION

- A. Advise installers of other work about specific requirements relating to placement of inserts, flashing reglets, metal anchors, and similar items to be used by stonework installer for anchoring, supporting, and flashing of dimension stonework. Furnish installers of other work with Drawings or templates showing locations of these items.
- B. Verify items provided by other sections of work are properly sized and located.
- C. Sheathed Surfaces: Install single layer of weather-resistant barrier. Lap joints with a 4-inches shingle fashion. Apply code approved metal lath, attach using galvanized nails a minimum of 6-inches on center vertically and 16 inches on center horizontally, which penetrate a minimum of 1-inch into the wood stud framing. Wrap weather resistant barrier and metal lath a minimum of 16 inches around all outside and inside corners.

- D. Concrete and Masonry Surfaces, New, Clean and Untreated: Examine newly poured concrete closely to ensure that the finished surface contains no releasing agents (form oil). If it does contain form oil, etch surface with muriatic acid, rinse thoroughly and score with a wire brush, or use high-pressure water, or sandblasting to remove. Apply single layer of weather-resistant barrier per Masonry Veneer Manufacturers Association (MVMA) guidelines. Install code approved metal lath to wall surfaces using galvanized concrete nails. Nails shall be a minimum of 6-inches on center vertically and 16 inches on center horizontally.

3.03 ERECTION

- A. Comply with manufacturer's product data, including product technical bulletins and published installation instructions.
- B. General: Install/set all units and accessories accurately, using skilled, experienced personnel, according to approved shop and setting drawings.
 - 1. Use stone-fitters to perform field-cutting with power saws, when required.
 - a. Cut simulated stone units with wet-saw.
- C. Clean stone surfaces before setting, using only water or mild cleaning compounds containing no caustic or abrasives. Clean cut units using a stiff fiber brush and clean water. Allow units to surface dry prior to placement.
- D. Provide chases, reveals, openings, and other spaces required to accommodate other work. Close up after other work is complete with simulated stone which matches stone already set.
- E. Mortar: Apply 3/4 inch of mortar to lath, covering a maximum of 10 square feet at one time. Press the units firmly into position in soft mortar bed, wiggle and apply slight pressure to unit to ensure firm bonding causing mortar to extrude slightly around edges of units.
 - 1. For stones applied in hot or dry weather, the back of each piece shall be moistened with a fine spray of water or a wet brush to adequately prevent excessive absorption of moisture from the mortar. If being installed over concrete, masonry or scratch coat substrate, the substrate surface area should also be dampened before applying mortar.
 - 2. Applications should be protected from freezing, as mortar will not set up properly under such conditions. Do NOT use antifreeze compounds to lower the freezing point of mortar.
- F. Masonry Flashing: Extend flashing through veneer, turn up and bed into mortar joint of masonry, seal to concrete or seal into sheathing over stud framed back-up.
 - 1. Lap end joints and seal watertight.
- G. Joints:
 - 1. Mortar joints should not be over 1/2-inch to 3/4-inch in width. Set simulated stone accurately, in patterns and locations indicated, with uniform joints of dimensions indicated, and with edges and faces aligned according to established relationships and indicated tolerances.
 - 2. Remove excess mortar; do not allow mortar to set up on face of units. Point and rake joints before mortar have set.
- H. Movement Control Joints
 - 1. Construct movement joints in locations noted on Drawings.
 - 2. Do not continue horizontal joint reinforcing across movement control joints.
 - 3. Form movement control joints by leaving head joints between stacked units void of mortar, ready for application of bond breaker and joint sealant.
 - 4. Size joint in accordance with Section 07 92 00 for sealant performance.

- I. Setting Units: Press each stone into the mortar setting bed firmly enough to squeeze some mortar out around the stone's edges. Apply pressure to the stone to ensure a good bond. Ensure complete coverage between the mortar bed and the surface of the stone. Mortar may also be applied to the entire back of the stone.
- J. Shim and adjust anchors, supports, and accessories.
- K. Mortar Color: As selected by Architect from manufacturer's standard colors

3.04 PROTECTION

- A. Protect work during erection as follows:
 - 1. Cover top of walls with nonstaining waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold securely in place.
 - 2. Prevent staining of stone from mortar, grout, sealants, and other sources. Immediately remove such materials from stone without damage to latter.
 - 3. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
 - 4. Protect sills, ledges, and projections from droppings of mortar and sealants.
- B. Provide final protection and maintain conditions in a manner acceptable to fabricator and installer ensuring dimension stonework being without damage or deterioration at time of Substantial Completion.

3.05 ADJUSTING AND CLEANING

- A. General: Perform final cleaning as soon as possible after mortar has set and been tooled. Clean faces of stone at pointed joints immediately. Remove soiled areas, streaks and stains from prefinished panels using clean water and soft bristle brush, followed by clear water rinse.
- B. Use no wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods which could damage, discoloration, etching of surfaces or joints, without written approval from simulated stone manufacturer.
- C. Clean stone surfaces that have become dirty or stained prior to setting to remove soil, stains, and foreign materials. Clean stones by thoroughly scrubbing stones with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.
- D. Remove and replace or repair simulated stone work of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stones. Broken, chipped, stained, or otherwise damaged stone may be repaired, providing the methods and results are acceptable to Architect.
 - 2. Defective joints.
 - 3. Stones and joints not matching approved samples and field-constructed mock-up.
 - 4. Simulated stone work not complying with other requirements indicated.
- E. Acceptable Appearance: Simulated stone shall show no obvious repairs or imperfections, other than minimal color variations, when viewed with the unaided eye at a 20 foot distance in normal daylight conditions.
- F. Replace in manner that results in dimension stonework matching approved samples and field-constructed mock-ups, complying with other requirements, and showing no evidence of replacement.
- G. Remove protection materials upon substantial performance of the work or when risk of damage is no longer present.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for ceiling-hung toilet compartments.
2. Steel framing and supports for overhead doors.
3. Steel framing and supports for countertops.
4. Steel framing and supports for mechanical and electrical equipment.
5. Steel framing and supports for applications where framing and supports are not specified in other Sections.
6. Steel pipe columns for supporting wood frame construction.
7. Metal Stairs.
8. Pipe-rail fittings system.
9. Metal ladders.
10. Metal ships' ladders.
11. Metal floor plate and supports.
12. Structural-steel door frames.
13. Miscellaneous steel trim including steel angle corner guards steel and edge angles.
14. Metal bollards.
15. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Division 04 Section "Concrete Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Division 05 Section "Structural Steel".
4. Division 06 Sections for metal framing anchors and timber connectors.

1.3 DESIGN REQUIREMENTS

- A. Stairs and Railings: Design to meet AMP 510 by NAAMM and requirements of all applicable codes.
 - 1. Stair and Landings: 100 psf live load capacity and 300 pound concentrated load.
 - 2. Railings: As required by applicable codes but not less than the following:
 - 3. Handrails: Size must not exceed recommendations of ADA and ANSI A117.1.
 - a. 200 lbs. concentrated load applied at any point in any direction.
 - b. 50 lb. uniform load applied in any direction.
 - 4. Guardrails:
 - a. 200 lbs. concentrated load applied at any point in any direction along top railing member.
 - b. 50 lb/ft uniform load applied horizontally at required railing height and a simultaneous uniform load of 100 lb/ft applied vertically downwards at top of guardrail.
 - 5. Guardrail Infill: 200 lb. horizontal load applied in any location over one square foot area.
 - 6. The following loads are not required to be applied simultaneously:
 - a. "Concentrated" and "uniform" loads for top railing.
 - b. Loads for top railing and in-fill areas.
 - c. Openings: Guards must not allow passage of a sphere 4 inches in diameter.
 - d. Posts and Anchorage: As required to safely accommodate all transmitted rail loads specified above.
 - 7. Post Spacing: Not to exceed that shown on drawings unless approved by Architect.
 - 8. Railing system must not reduce required exit width.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Metal nosings and treads.
 - 2. Paint products.
 - 3. Grout.
- B. LEED Submittals:
 - 1. Product Data for Credit MR 4.1: Indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.

- C. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Qualification Data: For qualified professional engineer.
- F. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.
- G. Welding certificates.
- H. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.8 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 10 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304
- D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- F. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
- G. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- H. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.
- I. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm).
 - 2. Material: Galvanized steel, ASTM A 653/A 653M, commercial steel, Type, with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.
 - 3. Material: Cold-rolled steel, ASTM A 1008/A 1008M, commercial steel, Type B; 0.0966-inch (2.5-mm) minimum thickness; coated with rust-inhibitive, baked-on, acrylic enamel.
- J. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.3 GALVANIZED STEEL MATERIALS

- A. Material for galvanizing to be geometrically suitable for galvanizing as described in ASTM A 384 and A 385. Steel materials suitable for galvanizing include structural shapes, pipe, sheet, fabrications and assemblies.
- B. Material to be chemically suitable for galvanizing.
- C. Recommended steel materials for hot dip galvanizing include, but are not limited to:
 - 1. Structural Shapes And Plates: ASTM A 36, A 242 type 2, A 283, A 500, A 501, A 529, A 572, and A 588.
 - 2. Steel For Sheet Metal Articles: ASTM A 569 or A 570.
 - 3. Steel For Pipe Or Tubing: ASTM A 53, A 120 or A 595 Gr A or B.
 - 4. Steel For Fasteners:

<u>General Category</u>	<u>Bolt Material</u>	<u>Nut Material</u>
Carbon Steel High Strength	A 307 GR A or B A 325 Type 1	A 563 Gr A A 563 Gr DH or A194 Gr 2H

Tower Bolts	A 394	A 563 Gr A
Quenched & Tempered Carbon Steel Bolts	A 449	A 563 Gr C
Quenched & Tempered Alloy Steel Bolts	A 354 Gr BC	A 563 Gr C

2.4 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.5 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
 - 2. Provide stainless-steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3 ; and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, provide flat washers as required.
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Eyebolts: ASTM A 489.
- G. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- H. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).
- I. Wood Screws: Flat head, ASME B18.6.1.
- J. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).
- K. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).

- L. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- M. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- N. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior and Exterior Locations: stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).
- O. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.6 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- F. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- H. Concrete: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.7 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.8 STANDARD PIPE RAILINGS:

- A. Conform with DESIGN REQUIREMENTS specified in PART 1 above.
- B. Pipe: Sizes listed are NPS and nominal inside diameter. Standard weight steel, Schedule 40; provide heavier weights as required to comply with Design Requirements above and size limitations below. Minimum size 1-1/2 inch diameter. Pipe sizes not to exceed those listed below unless larger sizes shown on drawings.
 - 1. Handrails: 1-1/2 diameter.
 - 2. Guardrails: 2-1/2 inch diameter.
 - 3. Guardrail Infill: 1-1/2 inch diameter.
 - 4. Posts: 1-1/2 inch diameter. Minimum weights as listed below. Advise Architect of conditions where indicated size and weights are insufficient to meet DESIGN REQUIREMENTS.
 - a. Schedule 40 Pipe: Typical up to 38 inches of unsupported height.
 - b. Schedule 80 Pipe (Extra Strength): For unsupported heights over 38 inches.

- c. Transitions between different size pipe, if any, must be acceptable to Architect.
 - d. Wall brackets, cap terminals and floor slip flanges, where indicated. Wall brackets to be #382 by Julius Blum & Co.
 - 5. Shop fabricated with minimum field splicing allowed.
 - 6. All construction welded per AWS D1.
 - 7. Work welds as specified under "Railing Joint Finishes" below.
 - 8. Shop finish with hot dip galvanized for exterior railings, and rust resistant primer on interior railings.
- C. Railing Joint Finishes: Finish joints in accordance with NOMMA Guideline 1 as follows:
- 1. Typical: Finish #2; completely sanded joint.

2.9 PIPE RAIL COUPLING SYSTEM

- A. Basis of Design: [KeeKlump](#), Kee Safety, Inc., 100 Stradtman St.; Buffalo, NY 14206; 716-896-4949.
- 1. Substitutions: As Approved.
- B. Materials:
- 1. Steel Pipe: Grade B seamed tube. ASTM A53
 - 2. Fittings, Including Elbows, Crossovers, Wall flanges, Tees, Couplings: Galvanized malleable cast iron structural pipe fittings. ASTM A447
 - 3. Galvanizing: ASTM A153.
- C. Handrails and Guardrails: Pipe, fittings, and accessories as indicated or required to match design indicated on the Drawings.
- 1. Fittings: Cast iron.
 - 2. Handrail Pipe Size: 1-1/2 inches (38 mm) industry standard - 1.90 inches (48 mm) O D.
 - 3. Product Utilization and Details: Refer to Drawings.
- D. Fasteners: Type 304 or 305 stainless steel.
- E. Finish: Exposed galvanized.

2.10 CURB ANGLES

- A. Curb Angles at Edge of Slab: Provide as shown and as indicated on approved shop drawings. Provide 1/2" x 6" Nelson studs at 12" c/c and 3" from ends. Unless otherwise shown or required, provide continuous angles at all exposed concrete edges as follows:
- 1. Curb Angles: 4" x 4" x 1/4".

2.11 OVERHEAD SUPPORT FRAMING FOR TOILET PARTITIONS

- A. Primary Member: Minimum C8 x 11.5 channel continuous above ceiling and in same plane as stall doors.
- B. Supports: 5/8 inch diameter threaded rod and double nuts. Attach channel to structure above at ends and 8 feet on center. Level to required height. Coordinate required height with partition supplier.
- C. Braces: 3" x 3" x 1/4 inch angles from channel to structure.
- 1. Perpendicular: From bottom of channel, install bracing perpendicular to, and on both sides of channel. Slope at approximately 45 degrees. Provide at ends and at not more than 5 foot centers.

2. Parallel: Where channel cannot be rigidly attached to concrete or minimum 8 inch thick masonry walls, provide diagonal "X" bracing from top of channel to bottom of structure above. Brace each independent channel.
3. Connections: Bolt until final adjustments complete; weld all steel-to-steel connections thereafter to preclude slippage.

2.12 METAL STAIRS

- A. Provide stair units, all landings, handrails, guard rails and all necessary appurtenances and supports for a complete installation of stairs in sizes and arrangements shown on drawings.
 1. Treads and Risers:
 - a. Treads shall be galvanized steel grating with open risers.
 2. Landings: Galvanized steel grating.
 3. Stringers: Hot rolled steel structural tube sections.
- B. Design: See DESIGN REQUIREMENTS in Part 1 above.
 1. Railings: See "Standard Pipe Railings" above.
- C. Submit detail and erection drawings indicating profile, dimensions, assembly, connections, anchorage, support, and installation clearances.
- D. Erect units in conformance with manufacturer's instructions.

2.13 METAL BOLLARDS

- A. Pipe Bollards: Minimum 6 inch diameter galvanized steel Schedule 40 pipe. Minimum 40 inch embedment into concrete base; 36 inch exposed height; welded cap or filled with concrete, both formed to shed water.

2.14 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.
- C. Prime plates with zinc-rich primer.

2.15 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches (200 mm) unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.16 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.17 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
 - 1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
 - 2. Unless otherwise indicated, provide 1/2-inch (12.7-mm) baseplates with four 5/8-inch (16-mm) anchor bolts and 1/4-inch (6.4-mm) top plates.
- D. Galvanize miscellaneous framing and supports where indicated.
- E. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.18 MISCELLANEOUS ITEMS

- A. Provide miscellaneous items where shown or required including, but not limited to, the following. All work to comply with requirements of structural drawings.
 - 1. Countertop Support Brackets: See detail. Provide support brackets for countertops as required so unsupported spans do not exceed 4'-6".
 - 2. Miscellaneous Framing: Provide all miscellaneous steel framing shown on Architectural series drawings which is not otherwise specified herein.
 - 3. Lavatory Supports: On non carrier mounted lavatories, provide cantilevered 3 x 3 x 1/4 inch angles from 4 x 4 x 1/4 inch vertical members between every other sink and at intervals not to exceed 5 feet. Include angle supports at walls and front of lavatory top.
 - 4. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
 - 5. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - a. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
 - b. Prime exterior miscellaneous steel trim with zinc-rich primer

2.19 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.20 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer unless zinc-rich primer is indicated.
- C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Items Indicated to Receive Primers Specified in Division 09 Section "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.21 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
 - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
 - 1. 3 not fill removable bollards with concrete.
- B. Anchor bollards to existing construction with anchor bolts. Provide four 3/4-inch (19-mm) bolts at each bollard unless otherwise indicated.

1. Embed anchor bolts at least 4 inches (100 mm) in concrete.
- C. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete. Fill annular space around bollard solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch (3 mm) toward bollard.
- D. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches (75 mm) above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- E. Anchor internal sleeves for removable bollards in place with concrete footings. Center and align sleeves in holes 3 inches (75 mm) above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace sleeves in position until concrete has cured.
- F. Place removable bollards over internal sleeves and secure with 3/4-inch (19-mm) machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner will furnish padlocks.
- G. Fill bollards solidly with concrete, mounding top surface to shed water.
 1. Do not fill removable bollards with concrete.
- H. Sealants" to provide a watertight installation.
- I. Fill cores solidly with concrete.

3.4 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations unless otherwise indicated.
 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

SECTION 07 10 00
GENERAL WATERPROOFING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Exterior waterproofing.
 - 2. Protection.
 - 3. Drainage mat.
- B. Coordinate finish and curing requirements of concrete surfaces, as it relates to application of the waterproofing materials, before installation of those substrates.

1.02 REFERENCE

- A. American Society for Testing and Materials (ASTM):
 - C 957-93(98) High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Integral Wearing Surface.
 - D 41-94 Asphalt Primer Used in Roofing and Waterproofing.
 - D 570-95 Test Method of Water Absorbtion of Plastics.
 - D 1752-84(1996) Prefomed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
 - D 1876-95 Test Method for Peel Resistance of Adhesives (T-Peel Test).
 - D 1970-97 Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - D 5385-93 Test Method for Hydrostatic Pressure Resistance of Waterproofing.
 - E 96-95 Test Methods for Water Vapor Transmission of Materials.
 - E 154-88(1993) Test Method for Water Vapor Retarders in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

1.03 SYSTEMS

- A. Provide waterproofing for locations and types specified regardless whether or not scheduled or shown on Drawings.
- B. Exterior Waterproofing: Provide for the following conditions and of types indicated:
 - 1. Concealed: Semi-liquid or sheet membrane. Provide for the following:
 - a. Vertical Surfaces: All vertical walls below grade where adjacent floor slab is also below grade.
 - (1) All horizontal slabs below grade; install on mudslab; tie into vertical waterproofing.
 - b. All other exterior applications normally required by waterproofing to prevent entrance of water into building.

1.04 PERFORMANCE REQUIREMENTS

- A. Installed system to provide watertight seal of all areas requiring waterproofing.
- B. Waterproofing to be capable of bridging cracks in substrate up to 1/16 inch wide, developed after cured membrane installed, without damage or loss of watertight seal. System to recover to original shape upon closing of crack without loss of its properties.
- C. Waterproofing to perform within temperature extremes of minus 40 to plus 150 degrees F.
- D. Waterproofing must be capable of bonding to concrete substrate including "blind side" applications for walls and floor slabs.
- E. Sheet Membrane System:
 - 1. Peel Adhesion: Minimum 4.0 lbs/in. width; ASTM D 1876 at 25 degrees F, modified as follows:
 - a. Specimen Size: 3" x 7" instead of 1" x 9".
 - b. Lap Adhesion Test: Performed after 15 minutes instead of 7 days.
 - c. Cross Head Speed: 2 in./min. instead of 10 in./min.
 - 2. Low Temperature Flexibility: Waterproofing membrane to be capable of being bent 180 degrees around a 1-inch diameter mandrel at -20 degrees F without cracking; test with adhesive side outward. ASTM D 1970.
 - 3. Puncture Resistance: Minimum 40 pounds; ASTM E 154.
 - 4. Peel Resistance: Minimum 3 pound per lineal inch; ASTM D 1876
 - 5. Resistance to Hydrostatic Head: Minimum 200 feet; ASTM D 5385.
 - 6. Permeance: 0.05 grains/sq. ft./hr Hg; ASTM E 96, Method B.
 - 7. Water Absorption: 0.1% maximum; ASTM D 570.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Product Data: Submit manufacturer's literature and technical data for the waterproofing system proposed showing compliance with specified performance characteristics. Only data capable of being evaluated will be accepted, and test results by means and methods other than that specified will not be reviewed.
- C. System Description: Provide complete description of installation of system including all components, fully described, and sequenced installation. Provide installation limitations, if any, and precautions.
- D. Shop Drawings: Show areas of waterproofing, expansion joints, splices, drain connections, and all termination details showing specific wall and deck construction, and additional materials as required.
- E. Samples: One 6 inch x 6 inch sample of waterproof coating system applied to minimum 1/8 inch thick cementitious board. Board to be saw kerfed on back side to allow crack to be developed.
- F. Sample Warranty: Submit in accordance with Section 01 33 50.
- G. Test Data: Submit for "Low Temperature Flexibility" specified under PERFORMANCE REQUIREMENTS above.

- H. Installation Instructions: Furnish manufacturer's printed instructions for installation of waterproofing, including procedures and materials for flashing, splicing, bonding and fastening, where applicable.
- I. Contamination Profile: The manufacturer shall provide the applicator, building owner and/or occupant with a tabular profile of chemicals, solutions, oils, compounds or materials which are injurious to the fluid-applied membrane system. This profile shall be established by a generic (or trade name) basis, including those materials normally found to exist in the work environment or likely to occur on this work. Also, the system should not be exposed to materials (directly or indirectly) as established by the Contamination Profile.
- J. Applicator's License Certificate: Copy of "Certificate of License" issued to system applicator by manufacturer.
- K. Closeout Submittals:
 - 1. Warranty: Upon completion of work under this section, submit an executed copy of the warranty in accordance with Section 01 33 50.

1.06 QUALITY ASSURANCE

- A. Materials: Obtain primary waterproofing materials of type required from single manufacturer. Provide secondary materials as specified and approved by manufacturer of primary materials.
- B. Installer: Licensed by the materials manufacturer and having five years experience in the application of waterproofing systems similar to this project.
- C. Pre-waterproofing Conference: Before installation of waterproofing and associated work, meet at project site with installer, manufacturer representatives, installer's of related work, and other entities concerned with waterproofing performance, including the Architect. Record discussions and agreements and furnish copy to each participant.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in sealed, undamaged containers identified with material name, date of manufacture and lot number.
- B. Exercise proper care to prevent damage to materials. Keep away from fire hazards or open flames.
- C. Store materials off ground in enclosures or under protective coverings. Assure that materials are kept clean and dry.

1.08 PROJECT CONDITIONS

- A. Verify conditions and dimensions of the job site.
- B. Install waterproofing only when satisfactory conditions prevail. Verify requirements with manufacturer of specific products; variances may occur.
 - 1. Minimum equivalent temperature for installation to proceed is 40 degrees F. (verify) and rising as adjusted by the wind chill factor.
 - 2. Substrate temperature between 40 degrees (verify) and 110 degrees F.
 - 3. Substrate surfaces are dry.

- C. Provide positive ventilation for any enclosed area continuously throughout the application and for a minimum of 8 hours afterward or until coatings have completely cured.
- D. Special Precautions: Allow no open fires or spark-producing equipment in the application area until vapors and fumes have dissipated. Post "No Smoking" signs in area and for at least 8 hours following application.
- E. Dam all drain openings to preclude spillage to drainage system.

1.09 WARRANTY

- A. Manufacturer and Contractor: Warranty waterproofing system against leaks, failures, and defects of materials or workmanship. Warranty shall provide full labor and materials as required to restore system to watertight condition and restore all materials damaged or removed by repair operations, without cost to Owner.
 - 1. Manufacturer's warranty to provide the primary coverage and will be looked to for initial relief from all claims made by the Owner.
 - 2. Contractor's warranty to provide secondary coverage to the extent that the manufacturer's warranty does not apply. The Contractor will be looked to for relief from all claims made by the Owner and not provided by the manufacturer.
- B. Warranty Period: 10 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS/PRODUCTS

- A. Concealed waterproofing: Provide one of the following systems:
 - 1. Semi-Liquid System:
 - a. "Liquid Membrane 6125" by American Hydrotech, Inc., Chicago, IL.
 - b. CCW-500-R by Carlisle Coatings & Waterproofing Inc., Sapulpa, OK.
 - c. Other Manufacturers: As approved.
 - 2. Sheet Membrane System:
 - a. Bituthene® systems by Grace Company, Chicago, IL.
 - b. "Mel-Rol" by W.R. Meadows, Inc., Elgin, IL.
 - c. "Miradri 860/861" by Mirafi.
 - d. CCE-701 by Carlisle Coatings & Waterproofing Inc., Sapulpa, OK.
 - e. Approved equal system by Laurent Corp., Twinsburg, OH.

2.02 FLUID-APPLIED SYSTEM

- A. Polyurethane System: Polyurethane rubber based liquid membrane material, self-bonding to normal substrates, compounded specifically for application method to be used (by hand or spray) and for slope of substrate, not less than 80 percent solids, and tested by manufacturer to comply with requirements of ASTM C 957.
- B. Neoprene System: Latex neoprene rubber based liquid membrane material, self bonding to normal substrates, compounded specifically for application method to be used (by hand or spray) and for slope of substrate, and tested by manufacturer to comply with requirements of ASTM C 957.
- C. Miscellaneous: As recommended by membrane manufacturer.

1. Primer, detail coatings, cants, reinforcing, flashing, bonding, adhesive, splicing, cement, sealants, backer rod, water cut off, mastic, pipe seals, pourable sealer, abrasive grit.
2. Others: As required for complete installation.

2.03 SEMI-LIQUID SYSTEM

- A. Membrane: Rubberized asphalt, self-bonding to normal substrates, compounded for hot (melted to liquid form) application by hand. Physical properties conforming to the manufacturer's published literature.
- B. Accessories: Primer, detail coatings, flashing, bonding, adhesive, splicing, cement, lap sealant, water cut off, mastic, pipe seals, pourable sealer, and other related items shall be as recommended by membrane manufacturer.
 1. Primer: Cut-back solvent type conforming to ASTM D 41.
 2. Flashing Reinforcing:
 - a. Sheet Type: "Flex Flash UN", 60 mil thick uncured neoprene flashing/reinforcing sheet in uncut rolls.
 - b. Fabric Type: "Flex Flash F", a spunbonded polyester fabric reinforcing sheet.
 3. Cants: Not required.
 4. Miscellaneous: As required for complete installation.
 5. Other: See ACCESSORIES in Part 2 below.

2.04 SHEET MEMBRANE SYSTEM

- A. Membrane: Self-adhering laminate sheet composed of rubberized asphalt and 4 mil thick high density polyethylene film; minimum 60 mils total thickness. Furnish in 36 inch x 60 foot long rolls with release paper. Physical properties conforming to manufacturer's published literature.
 1. Bituthane® 4000 for application temperatures 25 degrees F and above.
 2. Bituthane® *Prepruf*™ 300 for floors and blind-side walls.
- B. Membrane Accessories: Primer, detail coatings, flashing, bonding, adhesive, splicing, cement, lap sealant, water cut off, mastic, pipe seals, pourable sealer, and other related items shall be as recommended by membrane manufacturer.
 1. Primer:
 - a. "Bituthane Low VOC Primer".
 - b. "Bituthane P-3000 Primer".
 - c. "Bituthane System 4000 Surface Conditioner".
 - e. "Bituthane Green Concrete Primer" as needed.
 2. Elastomeric Mastic: "Bituthane Mastic".
 3. Liquid Membrane: "Bituthane Liquid Membrane"
 4. Cant: Liquid membrane. No other type cant permitted. At all inside corners; minimum face 3/4 inch.
 5. Other: See ACCESSORIES in Part 2 below.

2.05 ACCESSORIES

- A. Protection Board:
 1. Horizontal Work: Asphalt/felt board, 1/8 inch thick. Provide one of the following:
 - a. "Sealtight Protection Course" by W. R. Meadows, Inc.
 - b. "Elastibord", The Celotex Corporation.
 - c. "Asphaltic Hardboard" by W.R. Grace Co.
 2. Vertical Surfaces: One of the following:

- a. Fanfold Board: "Amocor-PB4" by Amoco, 1/4 inch thick extruded polystyrene with plastic facers. 4 foot x 50 foot, fanfolded on 2 foot centers.
 - b. Vertical Surfaces: Polystyrene bead board, 1 inch thick, 2'-0" x 4'-0" panels, 1 lb. density. Provide products by one of the following:
 - (1) W.R. Grace & Co.
 - (2) E. F. P. Corporation, Elkhart, IN.
 - (3) Century Foam Corporation, Columbus, OH.
 - (4) Others: As approved by waterproofing manufacturer and Architect.
- B. Slip Sheet: 6 mil polyethylene sheet (Visqueen)
- C. Expansion Joint Fillers: Provide membrane support and additional membrane length at joint.
1. Above Grade: Sponge foam tubing, size and properties as recommended by waterproofing membrane manufacturer.
 2. Below Grade: Self-expanding cork filler, ASTM D 1752, Type 3. Width equal to wall thickness less depth required for sealant at exposed surface, if any.
- D. Drainage Mat: "Miradrain" by Mirafi Inc. or approved equal by Grace, a manufactured drainage structure fabricated from polymeric sheet with polypropylene filter fabric on exterior side. Product forms three dimensional interlocking sheets, nominal 5/8 inch thick x 4 foot wide in 8 foot panels or rolls of 25 and 50 feet in length. Performance characteristics as follows:
1. Compressive Strength: 10,800 psf.
 2. Flow Rate: $Q = 15$ gpm/ft. width when tested in accordance with manufacturer's published literature.
 3. Types:
 - a. Vertical Surfaces: "6200" series.
 - b. Horizontal Surfaces: "9000" series.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine substrate and conditions under which waterproofing work is to be performed and notify General Contractor in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer.
- B. Cure concrete substrate a minimum of 28 days before waterproofing, unless this requirement is specifically waived by manufacturer, and is within permissible moisture limits recommended by manufacturer.

3.02 PREPARATION OF SUBSTRATE

- A. Clean substrate of projections, curing compounds, and substances detrimental to work or adversely affecting bond. Comply with waterproofing material manufacturer's installation instructions.
- B. Concrete Slabs: Clean concrete slab using abrasive steel shot process; see PREPARATION in Part 3 under Section 01 70 00 - Execution. Not required for mud slabs and other conditions where bond to substrate is not required.

- C. Bevel or round outside corners of substrate by grinding to produce a minimum 3/4 inch face or radius if not provided under Division 3.
- D. Install cant strips and similar accessories as shown and as recommended by prime materials manufacturer even though not shown.
- E. Fill voids, seal joints, and apply bond breakers as recommended by prime materials manufacturer, with particular attention at construction joints and expansion joints. Backer rod and sealant at expansion joints provided under Section 07 92 00.
- F. Prime substrate as recommended by prime materials manufacturer.
- G. Mask off adjoining surfaces not to receive waterproofing to effectively prevent spillage or overspray of liquid materials outside membrane area. Mask termination elevations to prevent application of waterproofing materials on other finish surfaces.

3.03 INSTALLATION, GENERAL

- A. Comply with manufacturer's instructions and details, except where more stringent requirements are shown or specified, and where project conditions require extra precautions or provisions to ensure satisfactory performance of work.
- B. Cants: Install cants at all inside corners receiving waterproofing.
- C. Insulation: Specified elsewhere.
- D. Expansion Joints: Provide waterproof treatment for expansion joints in waterproof membrane installed under this Section. Expansion joints to be watertight full length of joint including terminations.

3.04 INSTALLATION, FLUID-APPLIED SYSTEM

- A. Flashing: See "Thickness Schedule" below.
 - 1. Reinforced Flashing: Urethane systems only. Provide at all expansion and control joints, at all changes of plane where adjacent surfaces are not structurally and rigidly connected. Apply embedment coat of membrane material to surfaces to be flashed and extend a minimum of 6 inches onto deck surface and embed reinforcement in wet coating to within 2 inches of edge of embedment coating.
 - 2. Non-reinforced Flashing: Provide at construction joints not subject to movement, at all changes of plane where adjacent surfaces are structurally and rigidly connected, and at all piping and penetrations through membrane surface that do not require reinforced flashing. Apply coat of membrane material and extend for minimum of 4 inches onto deck surface. At penetrations through a vertical membrane, extend material for a minimum of 4 inches onto penetrating element.
- B. Membrane:
 - 1. Apply uniform coating of fluid-applied waterproofing to substrate and adjoining surfaces indicated to receive membrane.
 - 2. Thickness: As required by manufacturer.
 - 3. Apply coating either by hand or by machine spray, complying with manufacturer's recommendations regarding horizontal and vertical surfaces.

4. For Exposed membrane conditions, provide terminations at mechanical rooms and housekeeping pads as specified under INSTALLATION, GENERAL, above.
 5. Use self-leveling material for horizontal surfaces and surfaces up to 5 percent slope; use non-flow material for vertical surfaces and surfaces over 5 percent slope. Apply membrane over previously flashed areas and allow to cure in accordance with manufacturer's recommendations.
- C. Body Coat: Neoprene systems only. As required by manufacturer.
- D. Topcoat: As required by manufacturer. Install topcoat over membrane or body coat as applicable.
- E. Abrasive Grit: Install in location recommended by manufacturer. Provide uniform coverage.
- F. Protection Assembly: See PROTECTION below.

3.05 INSTALLATION, SEMI-LIQUID SYSTEM

- A. See INSTALLATION, GENERAL above for general procedures. Increase layers of membrane and flashings to comply with manufacturer's recommendations.
- A. Heating: Furnish asphalt at the point of application, at the optimum Equiviscous Temperature Range (EVT) of 375 degrees plus or minus 25 degree F. with the following restraints:
1. Asphalt should NOT be heated to or within 25 degrees of the actual COC Flash Point (FP) (ANSI/ASTM Test Method D 92). Maximum heating temperature 425 degrees F.
 2. Asphalt should NOT be heated and held above the Finished Blowing Temperature (FBT) for more than 4 hours.
- B. Prime surfaces to receive hot rubberized asphalt with surface conditioner applied at rate of 300-500 sq. ft./gal.
- C. Flashing: All detailing and flashings to be done in accordance with manufacturer's standard guideline details. In general, flashing required at the following locations:
1. Expansion joints.
 2. Cracks between 1/16 inch and 1/4 inch in width.
 3. Construction joints.
 4. At all changes of plane.
 5. At penetrations.
- D. Membrane/Reinforcing:
1. Apply uniform coating of semi-liquid waterproofing to substrate and adjoining surfaces indicated to receive membrane.
 2. Apply coating by hand, complying with manufacturer's recommendations regarding temperature and condition of membrane material.
 3. 215 Mil Thick System:
 - a. Provide continuous, monolithic coat of membrane, minimum 90 mils thick (approximately 2.3 mm).
 - b. Embed fabric reinforcing sheet into above coat while still wet. Overlap edges minimum 2 inches with membrane between sheets. Cover entire membrane.
 - c. Cover fabric reinforcing sheet with an additional 125 mil coat of membrane.
 - d. Total thickness 215 mil average coating thickness with no variation below 150 mil thickness.

- E. Protection Board: Embed protection sheet into membrane while it is still sufficiently hot to ensure a good bond. Cover all membrane including vertical surfaces. Lap edges minimum 3 inches.
- F. Protection Assembly: See PROTECTION below.

3.06 INSTALLATION, SHEET MEMBRANE SYSTEM

- A. Flashing:
 - 1. Corners and Joints: Provide at all expansion and control joints, at all corners and changes of plane. Install minimum 11" wide strip of sheet membrane material centered on corner or joint. Laps, if required, to conform to requirements specified for membrane below. Flashing to be covered by final membrane to provide double coverage.
 - 2. Drains and Protrusions: Apply 90 mil dry-film thickness coat of liquid membrane overlapping sheet membrane minimum 2". Extend liquid membrane minimum 4" onto penetrating element and cover drains.
 - 3. Cracks in slab or walls exceeding 1/16" wide to be pre-stripped with minimum 8" wide sheet membrane before installing final membrane.
- B. Membrane:
 - 1. Start work from lowest point. Roll membrane smooth and flat, free of fish mouths and air bubbles, in full contact with substrate.
 - 2. Lap all edge and end seams minimum 2 1/2"; stagger end laps.
 - 3. Walls: Install vertically in maximum 8 foot lengths; extend membrane over edge of footing.
 - 4. Trowel bead of mastic to all terminations and all laps within 12" of corners.
 - 5. Slit fish mouths and apply patch extending minimum 2 1/2" beyond cut in all directions and seal edge with mastic.
- C. Protection Assembly: See PROTECTION below.

3.07 FIELD QUALITY CONTROL

- A. Manufacturer's Representative: Manufacturer's representative to be present before start of work and at the various waterproofing stages to assure conformance with proper application and provide instruction, if required, for proper waterproofing procedures, for their product.
- B. Water-Test:
 - 1. Before completed membranes on horizontal surfaces are covered by protection course or other work, test for leaks with 2 inch depth of water maintained for 24 hours.
 - 2. Repair any leaks revealed by examination of substructure.
 - 3. Repeat test until no leakage is observed.

3.08 CLEANING

- A. Clean stains from adjacent surfaces.
- B. Remove foreign matter from finished coating surfaces, masking protection, equipment, material, and debris from deck and storage area.
- C. Clean waterproofed surfaces.

3.09 PROTECTION

- A. General:
 - 1. No traffic permitted on waterproofed deck until protection in place.
 - 2. After all curing, testing and repair work is complete, provide suitable protection assemblies for horizontal surfaces.

- B. Exposed Waterproofing System: No permanent protection required. Provide temporary protection over entire waterproofed surface until all work in space is completed. Protection assemblies may be increased in layers and thickness at Contractor's option, but shall be not less than listed below. All components to completely cover waterproofed area.
 - 1. Separator sheet of heavy kraft paper or cotton drop cloth over membrane.
 - 2. Protection board, 1/8 inch thick, over separator sheet placing boards with tight butt joints.
 - 3. Polyethylene sheet, minimum 6 mils thick; lap joints minimum 6 inches.
 - 4. Cardboard with tight butt joints.
 - 5. Plywood, 3/4 inch thick, with tight butt joints.

- C. Concealed Waterproofing System: After all curing, testing and repair work is complete, install protection assemblies as noted below.
 - 1. Slab on Grade: Provide temporary protection as recommended by manufacturer only where traffic is required. Remove before placing concrete. Concrete to be placed directly over waterproofing. Waterproofing to bond to concrete.
 - 2. Other Horizontal Surfaces:
 - a. Install one layer of 1/8 inch thick protection board over membrane, placing boards with tight butt joints and completely covering membrane.
 - b. Slip Sheet: Over protection board, place one layer of slip sheet, lapping edges 2 inches.
 - d. Over slip sheet, install one layer of drainage mat in accordance with manufacturer's recommendations.
 - 3. Vertical Surfaces:
 - a. Install one layer of drainage mat over membrane in accordance with manufacturer's recommendations. Completely cover membrane.
 - b. Install one layer of 1-inch thick protection board over drainage board except for areas receiving perimeter insulation. Place boards with tightly butted joints, completely covering drainage board except for areas receiving perimeter insulation specified elsewhere.
 - c. Over protection board, install slip sheet and drainage mat as specified above for "Horizontal Surfaces".
 - d. Do not nail or otherwise penetrate membrane to attach protection boards. Use suitable adhesive compatible with membrane and/or install protection board in layers ahead of backfilling.

- D. After all work by other trades is complete:
 - 1. Remove temporary protection assemblies from jobsite.
 - 2. Repair damage to membrane.
 - 3. Complete seals to core drilled penetrations.

END OF SECTION

SECTION 07 26 00
VAPOR RETARDER

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Membrane vapor retarders (vapor barriers).
 - 1. Below interior concrete floor slabs on grade.
- B. Related Sections:
 - 1. 03 30 00 Cast-in-place Concrete
 - 2. 06 10 00 Rough Carpentry
 - 3. 07 21 00 Building Insulation

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - D 882-97 Test Methods for Tensile Properties of Thin Plastic Sheeting.
 - D 2582-93 Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
 - D 4833-88(1996) Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 - E 96-95 Test Methods for Water Vapor Transmission of Materials.
 - E 1643-94 Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

1.3 PERFORMANCE REQUIREMENTS

- A. Slab Vapor Retarder:
 - 1. Water Vapor Transmission Rate (WVTR): Not greater than 0.050 gm/100 sq. inches in 24 hrs; ASTM E 96, Procedure "A".
 - 2. Tear Resistance: Not less than 15 lbs; ASTM D 2582.
 - 3. Tensile Strength: Not less than 65 lbs; ASTM D 882.
 - 4. Puncture Strength: Not less than 24 lbs; ASTM D 4833.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Product Literature: Submit for approval manufacturers product literature for each system specified.
- C. Test Data: Submit for all tests required under PERFORMANCE REQUIREMENTS above.

1.5 QUALITY ASSURANCE

- A. Work shall be performed by Contractor experienced in this type of application.

- B. Vapor barrier and joint sealing material must be from same manufacturer.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Slab Vapor Retarder: "T-65" by Griffolyn Co., Div. of Reef Industries, Inc. (800/231-6074), a multiply rubber modified plastic laminate reinforced with nylon cord; white on one side, black on the other side. Provide in maximum practical width.
 - 1. See PERFORMANCE REQUIREMENTS in Part 1 above.
 - 2. Minimum 25 pounds/1,000 square feet.
 - 3. Minimum Weight (pounds/1,000 square feet):
 - a. Total (membrane + geotextile): 65.
 - b. Membrane: 25.
 - 4. Minimum Thickness: 5 mils exclusive of reinforcement.
 - 5. Minimum Thickness:
 - a. Total (membrane + geotextile): 30 mils.
 - b. Membrane: 5 mils exclusive of reinforcement.Reinforcement: Minimum 48 cords (yarns) per sq. ft.
- B. Pipe Boots: Premoulded devices of same material as slab vapor retarder to facilitate sealing vapor retarder to penetrations. Sizes as needed for penetrations.

PART 3 EXECUTION

3.1 INSTALLATION; SLABS ON GRADE

- A. Install vapor retarder in accordance with manufacturer's written recommendations and the structural drawings.
 - 1. Install pipe boots before membrane installation.
 - 2. Joint Seals:
 - a. Seals with geotextile fabric must be made on bottom of membrane.
 - b. Lap joints in primary membrane require separate 12-inch wide splicing membrane with geotextile facer oriented downward and placed below primary membrane to present a bondable surface to membrane overlay.
 - c. Butt edges of primary membrane to center over splicing membrane.
- B. Place layer of membrane material over leveled gravel base under floor slabs on grade, lapping edges at least 6".
 - 1. Install with geotextile exposed.
 - 2. Lap and seal joints, seal edges to walls, column bases, etc.; fold and cement corners, or otherwise make vapor-retardant equal to or greater than the retardancy of the primary membrane.
 - 3. Provide sealed connection with piping and penetrating features; use premoulded pipe seals where possible.
- C. Seal punctures and cuts before placing concrete.
- D. Trim exposed vapor retarder at floor line after concrete has hardened.

END OF SECTION

SECTION 07 41 13
METAL ROOF PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Prefabricated roof and fascia sheets.
 2. Double lock seam with factory applied seal.
 3. Clips, cleats, anchors, and fasteners.
 4. Flashing and trim directly related to the metal roof.
 5. Metal panning, closures, and trim at intersections with adjacent materials.
 6. Secondary framing as required.
 7. Self-adhered roofing underlayment.
 8. Slip Sheet.
 9. Gutters, downspouts, attachment brackets and termination boots.
 10. Snow guards.

1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
- 501.1.94 Test Method for Metal Curtain Walls for Water Penetration Using Dynamic Pressure.
- B. American Iron & Steel Institute (AISI):
- SG-671 Design of Cold-Formed Steel Structural Members, March 1986.
- D. American National Standards Institute (ANSI):
- A58.1-1982 Minimum Design Loads for Building and Other Structures.
- E. American Society of Civil Engineers (ASCE)
- ASCE 7-93 Minimum Design Loads for Buildings and Other Structures.

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F. American Society for Testing and Materials (ASTM):

A 167-94A	Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
A 366-96	Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
A 653-95	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
A 792-96	Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
B 209-95	Aluminum and Aluminum-Alloy Sheet and Plate.
D 226-95	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
D 828-93	Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus.
D 1424-92	Test Methods for Tearing Strength of Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus.
E 1592-95	Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Air Pressure Difference.
E 1646-95	Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.

G. Copper Development Association (CDA):

Standards Handbook, Alloy Data/2, 8th Edition, 1985.

401/0 Sheet Copper Applications

H. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):

Architectural Sheet Metal Manual, Fifth Edition, 1993.

I. Underwriters Laboratories Inc. (UL):

580-94 Standards for Tests for Wind-Uplift Resistance of Roof Assemblies.

1.3 SYSTEM DESCRIPTION

A. Roof:

1. Roof Deck: Sloped wood deck.
2. Roof membrane dampproofing.
3. Slip Sheet.
4. Continuous roof panels.

- B. Design Requirements: Prepare complete design in accordance with the dimensions and general arrangements shown on the Drawings.
 - 1. Comply with pertinent requirements of governmental agencies having jurisdiction.
 - 2. Wind Loads: Design for the greater loading of the following:
 - a. As required by Code including ASCE-7.
 - b. As shown on drawings.
 - c. Not less than 25 psf.
 - 3. Thermal Movement:
 - a. Design to accommodate movements of roofing materials and substrates due to thermal changes in the widest range expected for the climatic conditions in which the project is located.
 - b. Location of metal roofing rigid connector to be designed per job conditions by roof system manufacturer.
 - 4. Capacities for gage, span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside test range is not acceptable.
 - 5. Framing, if required; design in accordance with AISI SG 671 and applicable codes.

1.4 PERFORMANCE REQUIREMENTS

- A. Design Requirements:
 - 1. Continuous, one-piece, preformed, prefinished single length roof panels.
 - 2. Panels, clips, and other components required for specific project conditions.
 - 3. Manufacturer is responsible for providing evidence acceptable to Architect that manufacturer's specified roof system is capable of meeting thermal, wind uplift, and performance requirements specified.
- B. Thermal Movement:
 - 1. Complete metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
 - 2. Interface between panel and expansion clip shall provide for applicable thermal movement in each direction along longitudinal direction.
- C. Performance Requirements:
 - 1. Underwriter's Laboratories, Inc. (UL) Wind Uplift Resistance Classification for Roof Assembly shall be Class 90, as installed, pursuant to Construction Number (selected from available assemblies in technical section of architectural binder) 431, 431A, 432, 433, 498, 498A, or 498B as defined by UL 580. Certified statements from manufacturer without proper UL classification will not be acceptable.
 - 2. Complete metal roof system shall have maximum static pressure air infiltration of 0.046 cfm / square foot with 1.57 psf air pressure differential when tested in accordance with

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ASTM E283-91 or 0.014 cfm / square foot with 1.57 psf air pressure differential when tested in accordance with ASTM E1680-95.

3. Complete metal roof system shall have no uncontrolled water penetration (dynamic water pressure), other than condensation, when exposed to dynamic rain at 6.24 psf differential static pressure when tested for not less than fifteen (15) minutes in duration in accordance with ASTM E331-93 or ASTM E1646-95.
4. Entire roofing system (metal panels, flashing, expansion joints, and penetrations), are to be detailed to provide watertight roof under peak weather conditions.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Product Data: Sufficient technical data to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Show all components; include materials, proposed fabrication, anchoring, and interface of the work of this Section with work of adjacent trades.
- D. Samples, of appropriate shape and dimension, to show type of solder or welding, fastener, base sheet, finish sheet, and other material required under this Section.
- E. Sample Warranty: Submit with shop drawings in accordance with Section 01 33 50 - Warranties.
- F. Quality Assurance Submittals:
 1. Manufacturer's Qualifications: Upon request, submit history of installations; see "Manufacturer" under QUALITY ASSURANCE below.
 2. Installer qualifications:
 - a. Submit sufficient data to demonstrate that the proposed installer has not less than ten years successful experience in fabricating and erecting metal roofing.
 - b. Include a list of installations of equivalent scope and complexity.
- G. Installation Instructions: Manufacturer's recommended installation instructions and procedures.
- H. Closeout Submittals:
 1. Warranty: Upon completion of work under this section, submit an executed copy of the warranty in accordance with Section 01 33 50 - Warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer:

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1. Roofing panels to be by national recognized manufacturer of metal roofing systems in operation for not less than 5 years.
 - a. Manufacturer to have history of successful installations; upon Architects' request, furnish list of not less than 50 installations during the last 5 years including address, Owner, and Architect.
 - b. Prior projects, if any, on which the Architect was architect must be listed and be satisfactory to the Architect in all respects.
- B. Field fabricating with portable roll-formers, if applicable, to not relieve manufacturer of responsibility of completed Work.
- C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- D. Installers to be trained and approved by system manufacturer
- E. Methods and materials not included under manufacturers standard system to comply with recommendations of SMACNA and CDA.

1.7 PRODUCT HANDLING

- A. See Section 01 60 00 Product Requirements
- B. Damaged or bent components may be rejected by the Architect.

1.8 WARRANTY

- A. Comply with requirements of Section 01 33 50 - Warranties.
- B. Roofing system shall be guaranteed by manufacturer and Contractor to Owner against leaks, failures, and defects of materials, workmanship or design. Guarantee to provide full labor and materials as required to restore system to watertight condition and defective materials without cost to Owner.
 1. Manufacturer's warranty shall provide primary coverage and will be looked to for initial relief from claims made by Owner.
 2. Contractor's warranty shall provide secondary coverage to extent that manufacturer's warranty does not apply. Contractor will be looked to for relief from claims made by Owner and not provided by manufacturer.
- C. Warranty Period:
 1. Weathertightness and Defects: 5 years.
 2. Paint Finish: 20 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Base Specification: Model #DL1517, double lock seam, roof assembly manufactured by Dimensional Metals, 58 Klema Drive North, Reynoldsburg, OH 43068. Ph: 740.927.3633 www.dmimetals.com.
- B. Subject to compliance with the requirements, provide the specified products or equal products by one of the following:
 - 1. Dimensional Metals Inc.
 - 2. Berridge Mfg. Co.
 - 3. Carlisle Engineered Metals.
 - 4. MM Systems Corporation.
 - 5. Vincent Metals.

2.2 MATERIALS

- A. Steel Sheet: 24 gage steel ASTM A 792.
- B. Secondary Framing: Manufacturer's standard steel framing system with hot dipped galvanized finish. Minimum 20 gage and G-90 galvanized coating.
- C. Self-Adhered Roofing Underlayment: Polyken 640 "Ice-O-Late" by Polyken Technologies, Division of the Kendall Co. (617/320-1000); a modified bituminous membrane, 40 mils thick, self adhering, self sealing moisture barrier or equal products by Grace Construction Products.
- D. Roof Underlayment: Standard red rosin paper, or slip sheet as recommended by the roofing manufacturer.
- E. Roof Clips: Manufacturer's standard devices which mounts directly to structural deck. Clips to allow for thermal expansion. Refer to "Design Requirements" under SYSTEM DESCRIPTION above.
 - 1. Compression components not less than 16 gage galvanized steel.
 - 2. Clips to be multi-piece devices with tabs factory centered for equal movement in either direction.
- F. Flexible Closure Strips: Closed cell, expanded cellular rubber self-extinguishing, cut or pre-molded to match configuration of the roof panels.

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- G. Equipment Curbs: Provide for all equipment mounted on roofing installed under this Section.
1. Coordinate with Division 22 and 23 for requirements.
 2. Curbs to be manufacturer's standard or custom design to provide adequate structural support for equipment and maintain watertight covering.
 - a. Fabricate to mate with roof panel configuration and pitch.
 - b. Provide cricket to divert water on high side of curb.
 - c. Attachment flange; minimum 3 inches wide.
 - d. Unit bodies: 18 gage sheet steel.
 - e. Wall insulation: Rigid glass fiber type; 3 pcf density; Custom thickness as required to meet or exceed R value of roof insulation.
- H. Sealant: Factory-applied seam sealant shall be non-curing butyl designed for metal to metal connection in concealed joints.
1. Field applied sealant and/or butyl tape shall be as recommended by the manufacturer of the metal roof system.
- I. Fasteners: Corrosion resistant, sizes and types as recommended by manufacturer for life of building and to meet or exceed performance criteria and conditions of application. Fasteners to meet performance requirements required wind rating and corrosion resistance.
1. Framing: Zinc plated threaded fasteners.
 2. Bearing Plate/Clip Attachments: Zinc plated threaded fasteners by Buildex with "Climaseal" coating.
 3. Typical: Concealed unless exposed type specifically approved by Architect.
 4. Cross Seams: Exposed type with metal-backed neoprene washer; color coated to match panels.
- J. Provide gutters, downspouts, termination boots, and associated attachments to structure as indicated on the drawings, and required for a complete assembly. Termination boots at downspout interface with site storm drainage components is work of this section.
- K. Snow Retention System: "S-5! ColorGard" by Metal Roof Innovations, Ltd. or approved equal by Vermont Slate and Tile.
1. Brackets: Manufactured from 6061-T6 alloy and temper aluminum extrusions conforming to ASTM B221 and AA Aluminum Standards and Data or cast aluminum.
 - a. Model: VersaBracket.
 - b. Screws for attachment of brackets to roof: Stainless steel, of type best suited to application.
 2. Cross Members: Manufactured from 6061-T6 alloy and temper aluminum extrusions conforming to ASTM B221 and AA Aluminum Standards and Data.
 - a. Receptacle in face to receive color-matched metal strips.
 - b. Provide splice connectors ensuring alignment and structural continuity at end joints.

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3. Color Strips: Same material and finish as roof panels; obtained from roof panel manufacturer.
4. Snow and Ice Clips: Aluminum, with rubber foot, minimum 3 inches wide.

L. Accessories:

1. Solder: ASTM B 32, type compatible with metal and as recommended by sheet metal manufacturer.
2. Clips: Manufacturer's standard.
3. Sealing Tape: 100 percent solids, pressure sensitive gray polyisobutylene compound tape with release paper backing. Not less than 1/2" wide and 1/8" thick, non-sag, nontoxic, non-staining, and permanently elastic.
4. Miscellaneous: As required for complete installation.

2.3 FABRICATION

- A. Shop fabricate to the maximum extent practicable except, field fabricate with manufacturer's licensed roll-forming equipment in lengths as long as necessary to preclude end joints.
 1. Strength of materials and provisions for expansion and contraction not to be exceeded.
 2. Brake-form to the indicated arrangement.
- B. Roof Panels: 17" wide continuous panels.
- C. Cross Seams: Provide full length panels where possible. Where cross seams are necessary lay out seams to be made in the direction of flow with higher pans overlapping the lower pans.
- D. Provide expansion seams, fastened and seamed securely, at all horizontal sightlines and at other locations as determined by the Contractor.
- E. Provide custom flashings and components as required to complete the roofing system.
- H. Hem exposed edges 1/2 inch on underside.
- F. Gutters and Downspouts: Furnish all components required for all conditions shown. See SUMMARY OF WORK in Part 1 above for installation of designated downspouts under another section.
- G. Closers: Manufacturer's standard factory pre-cut metal shapes. Metal to match panels. Provide for hip and ridge conditions.

2.4 FINISHES

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- A. Prefinished base sheet material shall be 24 Gauge (.024") Galvalume Aluminum-Zinc Alloy Coated Steel Grade C meeting ASTM A792.
- B. Finish shall be 70% Kynar 500 or Hylar 5000 Fluorocarbon coating, applied on a continuous coil coating line, with top side dry film thickness of 1.1 +/- .01 mil dry film thickness and on the reverse side a wash coat and primer of .04 +/- .01 mil total dry film thickness.
- C. Color: To be selected by the Architect from the manufacturer's current standard color selection guide.
- D. Protective Film: Apply strippable plastic film for protection during fabrication, shipping, and storage.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed. Notify Architect in writing of unacceptable conditions. Do not proceed until unsatisfactory conditions are corrected.
- B. Installation of work constitutes installer acceptance of substrate.

3.2 PREPARATION

- A. Protection: Require personnel to wear rubber-soled shoes when installing or walking on finished roof.
- B. Galvanic Action: Provide suitable separation for dissimilar metals to avoid electrolysis. Such separation to be consistent with recommendations of CDA and SMACNA and be suitable for conditions and long life.
- C. Remove protective film prior to installation.

3.3 FRAMING INSTALLATION

- A. Erect pre-engineered components in accordance with manufacturer's design and written recommendations. Secure assembly to building structure.
- B. Architecturally Exposed Deck and Framing: Attach framing members, through the wood deck to building structure with threaded fasteners. Align fastener to penetrate directly into the framing

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members below. Interior construction is architecturally exposed deck and framing, therefore fasteners must be concealed, and not visible to the interior of the building. Locate at spacing recommended by manufacture for support of roof panels under loading conditions specified under Part 1 above.

3.4 UNDERLAYMENT INSTALLATION

- A. Self-Adhered Roofing Underlayment:
 - 1. Install over rigid insulation board in accordance with membrane manufacturer's recommendations.
 - 2. Beginning at lowest edge of roof, install in successive rows, each row lapping the previous row.
 - 3. Edge and end seams to be lapped not less than 2 inches and made watertight.
 - 4. Provide at gutters. Cover edges of sheathing and lap to next lower metal substrate. Cover built-in gutters.

- B. Roof Underlayment: Install over self-adhered roofing underlayment to serve as slip sheet.

3.5 ROOFING INSTALLATION

- A. Install work in accordance with approved shop drawings and manufacturer's recommended installation procedures. Anchor all components firmly into position for long life under the anticipated weather conditions.

- B. Seam Clips: Layout and anchor the seam clips at the required spacing as the work progresses.
 - 1. Carefully align in straight and parallel rows.
 - 2. Anchor seam clips to sub framing with screws.
 - 3. Spacing: Not less than 18 inch centers.

- C. Roofing Pans: Anchor pans with seam clips. Provide additional clips to deck if required at cross seams. Cover seams with seam covers.

- D. Flashings: Complete miscellaneous flashings and custom sheet metal work necessary to complete the roof assembly.

- E. Install closers at openings left by seam and flashings.

3.6 DRAINAGE ACCESSORIES

- A. Install gutters and connect to downspouts to carry water off roof in accordance with manufacturer's recommendations.

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- B. Install gutters & downspouts and attach to structure as detailed.

- C. Install termination boots as indicated on the drawings where downspout interfaces with site storm drainage components.

3.7 SNOW GUARD INSTALLATION

- A. Install in accordance with manufacturer's written recommendations and approved shop drawings.

- B. Fasten devices directly to metal roof panel ribs; use of mechanical fasteners penetrating metal roof panels is prohibited.

- C. Pattern:
 - 1. Rows in line and parallel to eave.
 - 2. Beginning at eave, install first row no closer than 2'-0" from eave edge.
 - 3. Refer to roof plan for location.

3.8 PROTECTION

- A. Protect work from damage or abuse.
 - 1. Do not allow the installed work of this Section to be used as a storage space for other materials.
 - 2. Do not permit unnecessary walking on the finished roof.

END OF SECTION

SECTION 07 44 35
CEMENTITIOUS PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cementitious reveal joint panel system.
- B. Fiber Cement Panels, soffits, mouldings and trim.

1.2 REFERENCES

- A. ASTM International (ASTM):
 1. ASTM B136 - Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
 2. ASTM B244 - Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
 3. ASTM C834 - Standard Specification for Latex Sealants.
 4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 5. ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 7. ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
 8. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
 9. ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.
 10. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 11. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
 12. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure.
- B. AATCC127 - Water Resistance: Hydrostatic Pressure Test.
- C. TAPPI - T460 - Air Resistance of Paper (Gurley Method).

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Best Practices Building Guide.
 4. Technical data sheet.
- C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
- D. Selection Samples: For each finish product specified, two complete sets of color chips

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representing manufacturer's full range of available colors and patterns.

- E. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum of 2 years experience with installation of similar products and listed by Manufacturer as a preferred installation company.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.7 WARRANTY

- A. Reveal Panel Limited Product Warranty: 30-year limited product warranty against manufacturing defects.
- B. Workmanship Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis- of- design product; Subject to compliance with requirements, provide James Hardie Building Products, Inc., which is located at: 26300 La Alameda Suite 250 ; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Email: [request info \(info@jameshardie.com\)](mailto:info@jameshardie.com); Web: www.jameshardiecommercial.com or comparable product by one of the following:
 - 1. Cemplank.
 - 2. CertainTeed Corp.
 - 3. GAF Materials Corporation.
 - 4. James Hardie.
 - 5. Nichiha Fiber Cement.

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- B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01 25 00.

2.2 REVEAL, FLAT PANEL & TRIM

- A. Flat Panels and Trim:
 - 1. Performance Requirements:
 - a. Fiber-cement Panels; ASTM C 1186 Type A Grade II. and ASTM E 136 as a noncombustible material.
 - b. Flame and Smoke Generation; ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
 - B. Reveal 7/16" Hardie® HZ5 Reveal™ Panel as manufactured by James Hardie Building Products, Inc., 3 feet 11.5 inches (1206 mm) wide by 7 feet 11.5 inches (2426 mm) long.
 - C. Flat Panels: Thicknesses indicated on the drawings.
 - D. Running Trim. Sizes and configurations indicated on the drawings.
 - E. Reveal Trim: Reveal™ Trims by Fry Reglet in the following profiles. Reveal Trims shall confirm to a 6063 alloy in T-5 temper with a minimum thickness of .050 inch. Provide the following trim components:
 - 1. Horizontal trim.
 - 2. Vertical trim.
 - 3. Horizontal end cut transition trim.
 - 4. Outside corner trim.
 - 5. Inside corner trim.
 - 6. J channel trim.
 - 7. Drip cap trim.

2.3 FIBER-CEMENT SOFFIT

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a) Cemplank.
 - b) CertainTeed Corp.
 - c) GAF Materials Corporation.
 - d) James Hardie.
- B. Pattern: Vented and Non-vented smooth texture; sizes indicated on the drawings.
- C. Ventilation: Provide drilled holes required soffit venting.
- D. Factory Priming: Manufacturer's standard acrylic primer.
- E. Finish: Factory primed ready for field painting.

2.4 WEATHER BARRIER

- A. Weather Barrier: Manufacturers standard sheet barrier, flashing and tapes engineered for climate.

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1. Thickness; 11 mil.

B. Performance Requirements:

1. Breathability; ASTM E96.
2. Tear strength; ASTM D1117.
3. Water resistance; AATCC127.
4. Air Penetration; TAPPI - T460.

2.5 FASTENERS

A. Fasteners: For attaching panel direct to sheathing or to rain screen provide the following:

1. Wood Framing:
 - a. Siding nails, 0.092 inch shank by 0.222 inch head diameter by 2 inches long.
 - b. Screws, No. 10 by 0.375 inch head diameter by 1.5 inch long
2. Steel Framing: Screws, No. 8 by 1-5/8 inch long by 0.33 inch head diameter.
3. Fasteners shall be of high quality stainless steel to ensure resistance to corrosion.
4. Field painting: fasteners should be treated to accept paint adhesion.

2.6 FINISHES

A. Panel:

1. Primer: Factory applied sealer/primer by manufacturer. Apply flat sheen finishes to panels.
2. Panel Finish: Manufacturers standard shop applied "ColorPlus" Coating.
 - a. Color: Timber Bark

B. Finishes of Reveal Trims:

1. Chem Film for field painting of Reveal Trims; Chem Film Coating shall conform to ASTM N D1730.
 - a. Color: Match siding panels.

2.7 ACCESSORIES

B. Aluminum Accessories: Where aluminum accessories are indicated, provide accessories complying with AAMA 1402.

1. Texture: Smooth.
2. Nominal Thickness: 0.024 inch (0.6 mm).
3. Finish: Manufacturer's standard primer and acrylic paint.

C. Decorative Accessories: Provide the following fiber-cement decorative accessories as indicated:

1. Fascia.
2. Moldings and trim.
3. As indicted on drawings.

D. Colors for Decorative Accessories: Match adjacent siding.

E. Flashing: Provide stainless-steel flashing complying with Division 07 Section "Sheet Metal Flashing and Trim" at window and door heads and where indicated.

1. Finish for Flashing: Factory-prime coating.

F. Fasteners:

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1. For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate.
 2. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch (6 mm), or three screw-threads, into substrate.
 3. For fastening fiber cement, use stainless-steel fasteners.
- G. Insect Screening for Soffit Vents: Stainless steel, 18-by-18 (1.4-by-1.4-mm) mesh.
- H. Continuous Soffit Vents: Aluminum, hat-channel shape, with perforations; 2 inches (51 mm) wide and not less than 96 inches (2438 mm) long.
1. Net-Free Area: 6 sq. in./linear ft. (420 sq. cm/m).
 2. Finish: Mill finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Nominal 2 inch by 4 inch (51 mm by 102 mm) wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
1. Install water-resistive barriers and claddings to dry surfaces.
 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
 3. Protect siding from other trades.
- D. Minimum 20 gauge 3-5/8 inch (92 mm) C-Stud 16 inches maximum metal framing complying with local building codes, including the use of water-resistive barriers and/or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
1. Install water-resistive barriers and claddings to dry surfaces.
 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
 3. Protect siding from other trades.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install materials in strict accordance with manufacturer's installation instructions.
- B. Place fasteners no closer than 3/4 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
- C. Use manufacturer's standard fasteners panels, trim, and reveal panels.

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- D. Install cement board panel over weather barrier.
- E. Install panel using 1/2 inch (13 mm) spacers at horizontal joints. Leave bottom edge of panel above all horizontal trims exposed, no caulking shall be placed at this overlap of Horizontal Reveal Trim. Factory primed edge shall always be used.
- F. Install a kickout flashing to deflect water away from the siding at the roof intersection.
- G. Install a self-adhering membrane on the wall before the subfascia and trim boards are nailed in place, and then install the kickout.
- H. Allow minimum vertical clearance between the bottom edge of siding and any other material in strict accordance with the manufacturer's installation instructions and as determined by manufacturer building zone requirements.
- I. Maintain clearance between siding and adjacent finished grade.
- J. Specific framing and fastener requirements - refer to the applicable building code compliance reports.

3.4 FINISHING

- A. Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic exterior flat grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions. Provide flat sheen for reveal panel finishing.
- B. Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to used on project.
- C. Provide Chem Film for field painting of reveal trims.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING & TRIM

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Light gauge sheet metal for flashing and trim.
 - 1. Coping.
 - 2. Scuppers.
 - 3. Guttering systems.
 - 4. Galvanized sheet metal wall base.
 - 5. Galvanized sheet metal trim.
 - 6. Miscellaneous flashing.

- B. Products Furnished but not Installed Under this Section:
 - 1. Counter flashing receivers or reglets:
 - a. Cast-In Concrete Type: Furnish to Section 03 30 00.
 - b. Built-In Masonry Type: Furnish to Section 04 22 00.

- C. Related Sections:
 - 1. General flashing requirements: Section 01 73 00.
 - 2. Through-wall flashing for masonry: Section 04 22 00.
 - 3. Manufactured Stone Masonry: Section 04 73 00.
 - 4. Treated wood: Section 06 05 73.
 - 5. Waterproofing: Section 07 13 26.
 - 6. Foundation Insulation: Section 07 21 00.
 - 7. Metal Roof Panels: 07 41 13.
 - 8. Siding: Section 07 46 00:
 - 9. Membrane flashing for roofing: Section 07 53 00.
 - 10. Sealants and joint backing: Section 07 92 00.

1.2 REFERENCES

- A. Sheet Metal & Air Conditioning Contractors National Association (SMACNA):
 - Architectural Sheet Metal Manual, 5th Edition, 1993. Plus Addendum No. 1, October 31, 1997.

- B. American Society for Testing and Materials (ASTM):
 - A 167-99 Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - A 653-01a Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - B 32-00 Specification for Solder Metal.
 - B 209-01 Aluminum and Aluminum-Alloy Sheet and Plate.
 - B 370-98 Copper Sheet and Strip for Building Construction.

- C. National Roofing Contractors Association (NRCA)
 - The NRCA Roofing & Waterproofing Manual, 4th Edition, 1996.

1.01 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Product Data: Submit data for roof edge systems indicating compliance with windstorm requirement; see "Roof Edge Systems" under QUALITY ASSURANCE below.
- C. Shop Drawings: Show details of fabrication, materials, joints, splices, fasteners, anchorages, and installation details; indicate connections and fastening to adjacent materials and construction; show provisions for thermal expansion and contraction.
- D. Paint Finishes: Submit sample for each color or paint finish required.

1.3 QUALITY ASSURANCE

- A. Subcontractor: Subcontract sheet metal associated with roofing as a part of the roofing contract for undivided responsibility.
- B. Full approval of roofing manufacturer required for attachments to or penetrations in roofing systems. Obtain approvals as required for installation of work under this Section. Notify Architect of deviations from documents is required to obtain approval from roofing manufacturer prior to installation.
- C. Roof Edge Systems: Metal roof edge systems including copings and gravel stops to meet or exceed Factory Mutual requirements for wind storm ratings specified elsewhere for membrane roofing.

1.4 JOB CONDITIONS

- A. Substrates: Delay installation of flashing and trim until substrate construction, blocking and other support construction is complete and ready to receive sheet metal.

1.5 WARRANTY

- A. Sheet metal associated with roofing is a part of the warranty required for roofing system except length of warranty to be 2 years.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Terne-Coated Stainless Steel; "TCS II": Type 304 stainless steel, ASTM A 167 with "ZT" (50% zinc, 50% tin) alloy coating on both sides; 0.015" thick unless otherwise noted. Product by Follansbee Steel Corp.
- B. Galvanized steel: Commercial quality (CQ) with 0.20 percent copper, ASTM A 653, except Lock-Forming Quality (LFQ) for lock-forming, G90 hot-dip galvanized, mill phosphatized. 0.0359-inch thick (20 gage minimum) unless otherwise noted.
- C. Aluminum: ASTM B 209, alloy as needed for strength and finishing, smooth surface.
- D. Solder: Provide material complying with requirements of ASTM B 32; type compatible with metal and as recommended by sheet metal manufacturer.

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- E. Fasteners: Non-corrosive and compatible with metal; types as approved on shop drawings. 300 Series, Stainless Steel; provide with neoprene washers for screws in exposed applications.
- F. Sealant: Silicone as specified under Section 07 92 00.
- G. Slip Sheet: Rosin-surfaced building paper weighing not less than 4 lbs. per 100 sq. ft.
- H. Flexible Membrane Flashing: EDPM, minimum 45 mils thick. Product by Carlisle Syntec.
- I. Miscellaneous: Provide all incidental materials, methods, tools and equipment required for the fabrication and installation of sheet metal work shown on drawings.

2.2 MANUFACTURED UNITS

- A. Provide manufactured items in materials listed below in lieu of shop formed items unless specified otherwise.
- B. Factory Finish:
 - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- C. Manufactured Coping: Products by W.P. Hickman Co., MM Systems Corp., Metal-Era, or approved equal.
 - 1. Aluminum, prefinished, 0.063" thick.
 - 2. Standard and custom profiles as indicated.
 - 3. Slope to drain towards roof. Seams to be coverplate type, 6" wide, centered on joint.
 - 4. Corners to be mitered and welded.
 - 5. Prefinished: See "Factory Finish" above.
- D. Curtain Wall Cap: Formed product by same manufacturer as "Coping" above.
 - 1. Aluminum, prefinished, 0.063" thick.
 - 2. Custom profiles as indicated.
 - 3. Seams to be coverplate type, 6" wide, centered on joint.
 - 4. Corners to be mitered and welded.
 - 5. Prefinished: See "Factory Finish" above.
- E. Counter Flashing: Products by Fry Reglet Corp.; two-piece receiver and counterflashing.
 - 1. Springlock Type in stainless steel, 0.020" thick.
 - a. Type "CO" where shown as cast-in reglet.
 - b. Type "MA" where shown built in masonry.
 - c. Type "SM" where shown as surface mounted.
 - 2. Provide factory mitered and sealed corners, connector clips, joint covers, anchor clips, and necessary accessories for proper installation as detailed.

2.3 FABRICATION

- A. General: Shop-fabricate items in accordance with SMACNA standards and methods modified as required to conform with details shown on drawings, unless otherwise approved by Architect.
 - 1. See FLASHING under Section 01 73 00.
 - 2. Provide end dams and back stops for through wall or partial through wall flashing.
 - 3. Accurately form shapes and profiles to sizes and dimensions indicated on drawings. Verify field dimensions where critical for satisfactory fit.

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4. Make all lines, angles, edges and moldings straight, sharp and true; reinforce as required for rigidity and strength.
 5. Form all sheet metal exposed on exterior to be weatherproof with seams overlapping in the direction of water flow.
 6. Fabricate with minimum number of joints and seams finished neatly in true straight lines.
 7. Form all exterior sheet metal with allowances for thermal expansion and contraction.
 8. Form free from waves and buckles.
- B. Thickness: Conform to SMACNA requirements for thickness of metal components related to application and size of component.
- C. Counter Flashing: See MANUFACTURED UNITS above. Provide manufactured products or equal shop fabricated items in TCS as approved by Architect.
- D. Coping: Manufactured; see MANUFACTURED UNITS above.
- E. Gutter and Downspout: Specified elsewhere.
- F. Drain Assembly: TCS.
1. Thru-wall Scupper: SMACNA Fig. 1-26a.
 2. Overflow Scupper: SMACNA Fig. 1-28.
 3. Leader: SMACNA Fig. 1-27A.
 4. Gutter: SMACNA Fig. Style A.
 5. Downspout: SMACNA Fig. 1-32a; round.
 6. Downspout Hanger: SMACNA Fig. 1-35j
 7. Conductor Head: SMACNA Fig. 1-25f
- G. Roof Drain Gravel Stop: TCS. NRCA Detail #MB-23B – Roof Drain with Gravel Stop, 1995. Scuppers: TCS. SMACNA Fig. 1-30.
- H. Insulation Cap: Aluminum, pre-finished dark brown paint, minimum 0.0375 inch thick. Custom "J" shaped device to cover top of exposed foundation insulation specified elsewhere. Fabricate from 8 inch wide stock.
1. Short Leg: 1 inch.
 2. Top: Inside dimension as required for snug fit over insulation. Bevel top to slope 1/2 inch.
- I. Beam Covers: TCS. SMACNA Fig. 3-9 similar.
- J. Miscellaneous Flashing: As shown or required. TCS typical, gages not less than recommended by SMACNA or manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and installation conditions. Do not install flashing and sheet metal work until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of conditions and responsibility for satisfactory performance.

3.2 INSTALLATION

- A. General:

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1. Comply with SMACNA recommendations for handling and installing the sheet metal work.
 2. Coordinate installation with work of other trades for proper sequencing and installation.
 3. Provide slip sheet under sheet metal work.
 4. Separate or provide suitable coating on dissimilar metals to prevent electrolysis.
- B. Seams: Provide soldered flat lock seams, unless otherwise indicated; comply with metal manufacturer's recommendations for tinning, soldering and cleaning joints.
- C. Expansion Joints: Provide thermal expansion joints for all exposed sheet metal exceeding 15 feet running length; spacing in accordance with SMACNA recommendations or as shown on drawings. Conceal expansion provisions wherever practicable.
- D. Fasteners: Install with concealed fasteners and anchors, unless otherwise specified or approved. Use neoprene washers with screws exposed to water penetration to seal hole in flashing; draw screws snug to make seal; do not over tighten.
- E. Coping:
1. Membrane flashing specified under Section 07530 to be provided under all metal coping. Coordinate installation.
 2. Immediately prior to setting joint covers, apply continuous bead of sealant on both sides of joints as needed to form seal.
- F. Insulation Cap: Install metal cap over exposed top of board. Set level with joints tightly fitted. Miter corners. Leave ready to be sealed to building under another section.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Colored sealant and backing materials.
2. Work includes but not limited to, sealing joints in the following:
 - a. Concrete slabs.
 - b. Frame perimeters abutting other materials; door, window, louver.
 - c. Internal system sealants provided by component installer.
 - d. Interior sealants.
 - e. Trimming of exposed flashing.

B. Related Sections:

1. Division 03 Section "Concrete" for concrete control and expansion joint fillers and gaskets.
2. Division 04 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
3. Division 07 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
4. Division 08 Section "Glazing" for glazing sealants.
5. Division 22 Plumbing Fixtures
6. Division 32 Section "Concrete Paving Joint Sealants" for sealing joints in pavements, walkways, and curbing.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

- | | |
|------------|--|
| C 920-94 | Elastomeric Joint Sealants. |
| C 1016-94a | Test Method for Determination of Water Absorption of Sealant Backup (Joint Filler) Material. |
| C 1193-91 | Use of Joint Sealants, Standard Guide for. |
| C 1247-93 | Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids. |
| C 1248-93 | Staining of Porous Substrates by Joint Sealants. |
| C 1330-96 | Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants. |
| D 1622-93 | Apparent Density of Rigid Cellular Plastics. |
| D 1623-78 | Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics. |

B. Sealant, Waterproofing and Restoration Institute (SWRI):

Applicator Training Manual.

1.3 SUBMITTALS

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- A. Submit in accordance with Section 01 33 00.
- B. Samples: Submit samples of each color and type of sealant proposed for use on the Work; obtain approval before proceeding.
- C. Product Data: Submit copies of tests and other product data verifying conformance with specified performance characteristics.
- D. Shop Drawings:
- E. LEED Submittal:
 1. Product Data for Credit EQ 4.1: For sealants and sealant primers used inside the building envelope, including printed statement of VOC content.
 2. Manufacturers' Pre-Application Testing Log; see QUALITY ASSURANCE below.

1.4 QUALITY ASSURANCE

- A. Qualifications: Installer must be experienced in the installation of bulk sealant and able to show similar installations in watertight condition; must be approved by Architect and sealant manufacturer. Applicators to be trained in accordance with the SWRI Applicator Training Manual.
- B. Job Mock-Up: After all approvals have been obtained, provide job mock-up of typical joints with sealant installed according to shop drawings. Mock-up is to be standard of quality with respect to color, workmanship and tooling. Obtain approval of Architect.
- C. Defective Materials: Do not use sealant materials found by testing to be marginal or not acceptable. Tester to immediately notify Architect and General Contractor. General Contractor to immediately remove materials from site.
- D. Manufacturers' Instruction: Manufacturer of sealants for exterior building enclosure to provide instruction to installers' foreman and mechanics, and General Contractor on proper installation techniques required to achieve maximum life and weathertightness from the sealant installation. Special emphasis to be directed to practices required to avoid staining or other changes in appearances of sealed components such as granite in the completed work.

1.5 DELIVERY, STORAGE & HANDLING

- A. Deliver materials to site in original sealed and labeled containers bearing manufacturer's name, brand name, date of manufacture, color designation, and instructions for storage.
- B. Store materials in a well ventilated space maintained at temperatures below 75 degrees F. unless more stringent controls required by manufacturer. Storage in truck trailers not acceptable unless trailer is equipped with suitable HVAC system. Temperatures above manufacturers suggested limits are detrimental to sealant materials. Improper storage may result in rejection of materials; see QUALITY ASSURANCE.

1.6 JOB CONDITIONS

- A. Environmental Conditions: Performance of joint sealing work is subject to the following environmental conditions.
 1. Temperature: Perform all work within temperature range of 40 degree F and 85 degree F.
 2. Moisture: Do no work when moisture is present or when surfaces to be sealed are wet.

1.7 WARRANTY

- A. Sealants to be guaranteed by manufacturer and Contractor to:
 - 1. Maintain sealed joints in a weather-tight condition without loss of bond.
 - 2. Not stain or cause change in appearance to occur on sealed materials such as exposed cement board and wood when used as finish materials
- B. Warranty period: 5 years.
- C. Conditions: Provide the following at no cost to Owner:
 - 1. Replace failed joints with new materials meeting the requirements of the Contract Documents; repair damage to adjacent construction caused by replacement.
 - 2. Replace stained materials with new materials meeting the requirements of the Contract Documents; repair damage to adjacent construction caused by replacement.
- D. Coverage:
 - 1. Manufacturer's warranty to provide primary coverage and will be looked to for initial relief from all claims made by the Owner.
 - 2. Contractor's warranty to provide secondary coverage to the extent that the manufacturer's warranty does not apply. The Contractor will be looked to for relief from all claims made by the Owner and not provided by the manufacturer.
- E. Warranty Period: 5 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Products listed below shall be as offered by one of the following manufacturers:
 - 1. Approved Manufacturers:
 - a. [Dow Corning Corp.](#) (800-248-2481)
 - b. [General Electric \(GE\) Silicones](#) (800-255-8886)
 - c. [BASF Building Systems](#) (952-496-6000)
 - d. [Bostik Inc.](#) (800-523-2678)
 - e. [Pecora Corp.](#) (800-523-6688)
 - f. [Tremco, Inc.](#), an RPM Company (800-562-2728)

2.2 JOINT SEALANTS

- A. General:
 - 1. Colors: As shown on the Finish Schedule, or if not shown, match sealant material to colors of adjacent materials, as approved by Architect.
 - 2. Elastomeric Sealant Standard: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant, including those referencing ASTM C920 classifications for type, grade, class, and uses.
 - 3. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.
 - 4. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food provide products that comply with 21 CFR 177.2600.

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- B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
1. Architectural Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Sanitary Sealant, Interior Use:
1. One component silicone rubber sealant, complying with ASTM C920, Type S, Grade NS, for Use NT, Class 25, and FS-TT-S-001543, Class A. Provide acid cure, nonporous bond type, mildew resistant silicone rubber where both joint faces are metal, glass, plastic, tile, or other non-porous material.
 2. Acceptable Products:
 - a. "Omni-Plus"; [BASF Building Systems](#) (952-496-6000)
 - b. "786 Mildew Resistant"; [Dow Corning Corp.](#) (800-248-2481)
 - c. "Sanitary SCS1700"; [General Electric \(GE\) Silicones](#) (800-255-8886)
 - d. "Tremsil 200 Sanitary"; [Tremco, Inc.](#), an RPM Company (800-562-2728)
 - e. "898"; [Pecora Corp.](#) (800-523-6688)
- D. Interior Joints not subject to Movement:
1. One part, gun grade, acrylic latex meeting the requirements of ASTM C834, Type OP, Grade NF, with 10 year life expectancy.
 2. Acceptable Products:
 - a. "Chem-Calk 600"; [Bostik Inc.](#) (800-523-2678)
 - b. "AC-20+"; [Pecora Corp.](#) (800-523-6688)
 - c. "Tremflex 834"; [Tremco, Inc.](#), an RPM Company (800-562-2728)
 - d. "Sonolac"; [BASF Building Systems](#) (952-496-6000)
- E. Exterior joints greater than 1/2":
1. Two-part non-sag, polyurethane type, meeting ASTM C920, Type M, Grade NS, Class 50, Use NT, with 20 year life expectancy.
 2. Colors: Match sealant material to colors of adjacent materials, as selected by the Architect from manufacturer's standard colors.
 3. Acceptable Products:
 - a. "Chem-Calk 2641"; [Bostik Inc.](#) (800-523-2678)
 - b. "Dymeric 240 or 240FC"; [Tremco, Inc.](#), an RPM Company (800-562-2728)
 - c. "Dynatrol II"; [Pecora Corp.](#) (800-523-6688)
 - d. "Sonolastic NP2"; [BASF Building Systems](#) (952-496-6000)
- F. Exterior joints less than 1/2":
1. One-part, non-sag acrylic Terpolymer formulation meeting the requirements of ASTM C920, Type S, Grade NS, Class 25, Use FT, with 20-year life expectancy.
 2. Colors: Match sealant material to colors of adjacent materials, as selected by the Architect from manufacturer's standard colors.
 3. Acceptable Products:

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- a. "Dynatrol I-XL"; [Pecora Corp.](#) (800-523-6688)
- b. "Dymonic"; [Tremco, Inc.](#), an RPM Company (800-562-2728)
- c. "Vulkem 116"; [Tremco, Inc.](#), an RPM Company (800-562-2728)
- d. "Sonolastic NP1"; [BASF Building Systems](#) (952-496-6000)

H. Sealant Materials - Glazing: Refer to Section 08 80 00 GLAZING

2.3 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Bond Breaker Tape:
 1. Approved Manufacturers:
 - a. Pressure Sensitive 470 or 481 Polyethylene"; [3M Adhesives, Coatings and Sealers Div.](#), (800-328-1687)
 - b. Approved Substitution
- D. Cleaners for Nonporous Surfaces: Provide nonstaining, chemical cleaners of type which are acceptable to manufacturers of sealants and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.
 1. Provide cleaner conditioner required for glass and glazed surfaces as recommended by sealant manufacturer.
- E. Masking Tape: Provide non-staining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.
- F. Foam Sealant Tape: "Greyflex" by Emseal Joint Systems, Ltd., Westborough, MA; a self-adhesive precompressed open cell polyurethane foam tape impregnated with chemically stabilized acrylics; provide in sizes and types suitable for application as recommended by manufacturer for watertight seal.
- G. Backing Rod: ASTM C 1330, Type B. Non-staining extruded polyolefin or polyethylene foam with non-absorbing outer skin and highly resilient interior network of open and closed cells which do not out-gas when ruptured. Size approximately 25% larger than joint-size.
 1. Properties:
 - a. Water Absorption: Less than 0.03 grams/cc; ASTM C 1016.
 - b. Density: 2.0 pcf; (24-48 kg/m³) ASTM D 1622.
 - c. Tensile Strength: 50 psi min. (200 kPa min.); ASTM D 1623.
 - d. Compression Recovery at 50%: More than 90%; ASTM D 5249.
 2. Provide one of the following:
 - a. "Sof Rod" by [Nomaco Inc.](#), Zebuon, NC (800/345-7279).
 - b. "Sonolastic Soft Backer Rod"; [BASF Building Systems](#) (952-496-6000)
 - c. "ITP Soft Type Backer Rod" by Industrial Thermo Polymers Limited, Mississauga, Ontario.
 - d. Approved equal.
- H. Colors: As selected by Architect.
- I. Accessories:
 1. Primer: Provide primer material made or recommended by the sealant manufacturer for the conditions and substrates of the application.
 2. Bond Breaker Tape: Polyethylene or plastic tape as recommended by sealant manufacturer.

3. Miscellaneous: As required for complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Installer must examine substrate and conditions under which sealant work is to be performed; notify Construction Manager in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer. This paragraph is not intended to preclude normal surface cleaning/preparation required by installer.
- B. Application of sealant materials constitutes acceptance of joint surfaces as suitable to receive sealant.

3.2 PREPARATION

- A. The following items required prior to installing sealants; refer to QUALITY ASSURANCE in Part 1:
 1. Obtain manufacturer's instructions for sealant installation and practices for installing crew.
 2. Verify manufacturer has performed testing on the specific batch or lot of sealant to be used and approved its use.
- B. Clean joint surfaces free from dirt, dust and any other contaminants affecting bond of the sealant material. Apply sealants to dry surfaces only. Remove lacquers and protective films from metal surfaces.
- C. Apply no sealant until mock-up applications are approved.

3.3 INSTALLATION

- A. General:
 1. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
 2. Mix and apply sealant materials in accordance with manufacturer's instructions and approved shop drawings; apply sealant before weatherproofing materials are applied.
- B. Priming: Apply primer to contact surfaces as recommended by sealant manufacturer for the conditions of the application; if recommended, apply full strength, undiluted in uniform coating over surfaces.
- C. Backing: Provide backing materials in as long lengths as practicable; install with proper tool, forcing backing into joint to proper depth for sealant.
 1. Provide backing rod at all joints.
 2. Provide foam sealant tape at exterior shelf angles and expansion joints.
- D. Application: Applications of sealing materials are noted on drawings or specified in other sections of these Specifications. Apply sealant over backing to uniform thickness in continuous beads, filling all joints and voids solid; superficial pointing with skim bead will not be accepted. After application, tool surface to achieve complete adhesion and contact. Leave surface of sealant slightly concave.
- E. Masonry Flashing: Where sealant joint is in direct contact with flexible masonry flashing, trim flashing flush with face of masonry after sealant is installed and cured. This procedure is to prevent sealing required weeps.

3.4 CLEANING

- A. Upon completion, remove and dispose of masking materials; remove all excess sealing materials; clean adjacent surfaces of all soil and stain resulting from sealing operations.

3.5 SCHEDULE

- A. General: Apply sealant at all locations which normally require sealing to prevent infiltration of air, water, and insects and to reduce transmission of sound. Include the following:
 - 1. Metal Coping: Where metal coping laps weatherseal portion of wall less than 4 inches, seal with sealant to prevent water from rising between coping and wall due to wind. Not required interior side of coping if roofing membrane extends full height of parapet and terminates on exterior side of wall.
 - 2. Where shown.
 - 3. As listed in paragraphs below.
- B. Polyurethane Sealant: Pavement or materials subject to foot traffic.
- C. Silicone Sealants:
 - 1. Low Modulus Sealant: All exterior expansion joints except paving.
 - 2. Medium Modulus Sealant:
 - a. All exterior joints except paving.
 - b. All exterior metal to metal joints.
 - c. Where detailed.
- D. Polysulfide Sealants: Apply one or two-part sealants, at Contractor's option, to any joint requiring sealant in a below grade condition or condition of prolonged wetness. Verify with Architect.
- E. Acrylic Latex Caulking: Apply at intersection of exposed structure or ceiling construction with masonry walls, registers, grilles, louvers, around cabinets and casework abutting walls, and all other static interior joints. Provide at both sides of all interior door frames; install before paint finishes specified elsewhere, are applied.
- F. Sanitary Sealant:
 - 1. Flooring: Seal intersection of flooring and penetrations with sealant; include fixtures, piping, and other conditions where base is not installed such as bathtub, shower receptors, and toilets. Verify compatibility of sealant with flooring materials prior to installation.
 - 2. Walls: Seal intersection of wall and plumbing fixtures and penetrations with sealant; include shower receptor, urinals, and sinks.
- G. Foam Sealant Tape: Provide at the following locations:
 - 1. At expansion joints in exterior walls.
 - 2. Where partitions terminate into window mullions.

END OF SECTION

SECTION 09 28 10
GYPSUM BOARD

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Gypsum wallboard on wall and ceiling framing.
- B. Related Sections:
 - 1. 07 92 00 Joint Sealants.
 - 2. 09 91 00 Painting.

1.2 DEFINITIONS

- A. Critical Lighting Areas: Strong sidelighting from windows skylights, or light fixtures which reveal surface imperfections. Areas or conditions include, but are not limited to, the following:
 - 1. Wall and ceiling areas abutting windows or skylights.
 - 2. Long hallways.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - C 36-97 Gypsum Wallboard.
 - C 442-97 Gypsum Backing Board and Coreboard.
 - C 840-97 Application and Finishing of Gypsum Board.
 - C 931-97 Exterior Gypsum Soffit Board.
- B. Gypsum Association (GA):
 - GA-214-96 Levels of Gypsum Board Finish
- C. Underwriters' Laboratories, Inc. (UL):
 - Fire-Resistance Directory, 1998 or latest edition thereof.

1.4 QUALITY ASSURANCE

- A. Qualifications: Provide materials and methods tested for required fire separations, installed in accordance with this specification and the requirements of local building officials.
- B. Except where specified otherwise, provide gypsum board and accessory products by same manufacturer to ensure compatibility and single source responsibility.
- C. Allowable Tolerances: Provide framing fabricated and erected to conform with the following allowable tolerances.
 - 1. Partition Framing: Plumb and located within plus or minus 1/4" of required locations, noncumulative.
 - 2. Ceiling Framing: Level within 1/8" in 10' and erected so that deflection of any component does not exceed 1/360 of its span after installation of all finish materials and equipment.

- D. Assembly Responsibility: Contractor to ensure rated assemblies can be substantiated by applicable tests using the proposed products. Where assembly rating cannot be substantiated by applicable tests, provide approved products which fulfill rating requirements at no additional cost to Owner.
- E. Specification based on products manufactured by U.S. Gypsum Co., unless otherwise noted. Methods and materials to conform to manufacturer's recommendations as a minimum criteria except where more stringent provisions are shown or specified.
- F. Provide gypsum wallboard construction for hourly fire-resistive ratings as shown or specified using UL-approved designs or designs acceptable to the governing authorities and acceptable to the Architect.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to project site with manufacturer's labels intact and legible. Fire-rated materials shall bear testing agency label and fire classification numbers intact and legible. Handle materials with care to prevent damage.
- B. Store materials in dry interior spaces, off floor, stacked flat, and under cover.
 - 1. Avoid overloading floor system.
 - 2. Stack wallboard such that long lengths are not over short lengths.
 - 3. Store adhesives in a dry area protected from freezing.

1.6 PROJECT CONDITIONS

- A. Conform to the scope and general provisions of ASTM C 840, including maintenance of a uniform temperature of not less than 50 degrees in the building at least 48 hours prior to, during, and following the application of gypsum board and joint treatment materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. See "Assembly Responsibility" under QUALITY ASSURANCE in PART 1.
 - 1. U.S. Gypsum Co.
 - 2. Gold Bond Building Products (National Gypsum Co.).
 - 3. Georgia Pacific.

2.2 MATERIALS

- A. Gypsum Wallboard: All materials by same manufacturer unless otherwise indicated.
 - 1. Fiber Reinforced Gypsum Wallboard: Products by U.S. Gypsum Co.; a fiber-reinforced gypsum panel product with superior impact resistance meeting or exceeding requirements of gypsum wallboard and ASTM C 1278.
 - a. Standard Type: "Fiberock": 5/8" thick.
 - b. High-Impact Type: "Fiberock VHI" with special reinforcing mesh adhered to back side of panels. 5/8" thick.
 - 2. Moisture Retardant: ASTM C 630, Type X, W/R water-resistant gypsum panels with special multi-layered and chemically treated paper faces tapered and rounded edges:
 - a. 5/8" on walls and 1/2" thickness on ceilings.
- B. Metal Trim: Products by U.S. Gypsum Co. unless otherwise noted.

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1. For Outside Corners (Square): 'Dur-A-Bead'; spackled. See "Metal Corner Bead Backer" under "Miscellaneous Materials" below.
 2. For Exposed Edges: '200-B', or approved. Provide "L" shaped all metal edge trim; size to suit wallboard thickness and spackled.
 3. For Edge Abutting Window Frames: 'P-1 Vinyl Trim', or approved. Provide "J" shaped trim, not spackled.
 4. For Control Joints: "No. 093", or approved. Provide roll-formed zinc trim with tape protected 1/4" opening, 7/16" deep.
 5. Non-Square Corners: Unless otherwise noted, Beadex trim is specified as a standard for approval. Provide galvanized steel laminated with paper trim designed for concealed metal and for application without mechanical fastening, unless otherwise specified. Provide in types suitable for condition.
 6. For drywall flush with CMU units, Fry Reglet 'F' molding is specified as standard transition. Product: DRMF-625-50, clear anodized finish.
- C. Fasteners: Unless otherwise noted or indicated, provide Type "S" bugle head screws for attachment of wallboard to metal framing, and Type "S" pan head screws for attachment of framing to door frames.
1. Provide cadmium plated or "Climaseal" coated screws for attachment of gypsum materials subject to moisture.
- D. Joint Treatment: Types, compounds and reinforcements made, or recommended, by wallboard manufacturer, suitable for its intended function and application, and as required for fire resistive assemblies.
1. Tape: "Sheetrock Joint Tape" (Perf-A-Tape).
 2. Tape Embedment: "Sheetrock Setting-Type Joint Compound" (Durabond).
 3. Topping: "Plus 3" or USG Joint Compound - Topping.
 4. Provide special formulation for exterior soffits, if any, "Durabond XL Compound" or equivalent.
- E. Miscellaneous Materials: Provide all incidental and accessory materials, tools, equipment, and methods required for satisfactory completion of gypsum wallboard construction, including the following:
1. Adhesives: Types made, or recommended, by wallboard manufacturer for lamination or adhesion of materials.
 2. W/R Sealant: Manufacturer's standard for nail holes and cut edges of W/R board.
 3. Metal Corner Bead Backer: 25 ga. galvanized angles or bent sheet steel, 3" x 3" legs, full height, 1 piece. See "Multiple Layers" under APPLICATION OF WALLBOARD in Part 3 below for locations.

PART 3 EXECUTION

3.1 FRAMING

- A. Install metal framing for walls, soffits, and suspended ceilings receiving gypsum wallboard finish.
1. Provide for various recessed items in walls and partitions by using deeper studs or double studs as required for recessed items deeper than typical wall thicknesses. Review requirements with Architect before proceeding.

3.2 APPLICATION OF WALLBOARD

- A. In accordance with ASTM C 840.
- B. Inspection:
1. Check framing for accurate spacing and alignment.

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2. Do not proceed with installation of wallboard until deficiencies are corrected and surfaces to receive wallboard are acceptable. Protrusions of framing, twisted framing members, or unaligned members must be repaired before installation of wallboard is started.
- C. General:
1. Use wallboard of maximum lengths to minimize end joints.
 2. Stagger end joints when they occur.
 3. Locate end joints as far as possible from center of wall or ceiling.
 4. Abut wallboards without forcing.
 5. Neatly fit ends and edges of wallboard.
 6. Do not place butt ends against tapered edges.
 7. Support ends and edges of wallboard panels on framing or furring members except for face layer of double layer and where ends are back blocked and floated.
 8. No attachments to be made to Ceiling Deflection tracks, specified elsewhere, which would impair their ability to permit unrestrained vertical movement of building structure.
 9. Where integral cove base specified for resilient sheet flooring, wallboard to extend tight to floor; scribing not required; however, gaps not to exceed 1/8 inch over small lengths.
 10. Metal trim to be fully backed with gypsum board; lap corners fully; provide tight butt joints.
- D. Single Layer:
1. Ceilings:
 - a. Apply wallboard with long dimension at right angles to framing.
 - b. Back block ends and edges (and float ends) of wallboard.
 - c. Attach with screws at 8 inches o.c. at perimeter and 12 inches o.c. in field along framing members.
 2. Walls:
 - a. Apply wallboard vertically with long dimension parallel to framing.
 - b. Stagger end joints to occur on different framing members on opposite sides of partition.
 - c. Back block end joints.
 - d. Attach with screws at 12 inches o.c. at perimeter and in field along framing members.
- E. Multiple Layers:
1. Walls:
 - a. Apply all layers vertically with long edges parallel to studs.
 - b. Attach wallboard base layer and subsequent intermediate layer(s) with screws at 48 inches o.c. unless otherwise required for fire rating.
 - c. Apply face layer vertically with screws at 12 inches o.c. at perimeter and in field along framing members.
 - d. Stagger all joints.
 - 1) Stagger vertical joints of base layer on opposite side to partition to occur on different framing members.
 - 2) Minimum offset of joints and face layer from joints and base layer: 16 inches or stud spacing for vertical joints and 10 inches for horizontal joints.
 - e. Outside Corners: Install "Metal Corner Bead Backer" over first layer at corners receiving metal corner bead. Provide temporary attachment with adhesive; do not screw between layers where finished corner is exposed to view. Screw attach top layer of board through corner plate and into stud framing. Corner bead backer provides positive substrate for screw attachment of corner beads.
- F. Curved Surfaces: Install in accordance with recommendations of GA-226.
- G. Over Masonry:
1. Adhesive Attached:

- a. Verify that substrate is suitable for application of adhesive attached gypsum board including bond of adhesive to substrate.
 - b. Apply adhesive to backs of gypsum board with suitable spreader in accordance with manufacturer's recommendations.
 - c. Position boards for vertical application and press firmly into place. Fasten top and bottom board ends with masonry nails.
 - d. Re-impact boards within 12 hours to ensure adequate bond.
- H. Joint Treatment: See "Finishing" below.
1. Tape: Apply embedding compound filling joint completely and apply reinforcing tape centered over joint and seated in compound. Fold and embed tape at interior angles, including intersections between walls and ceilings, to furnish true angle. Allow to harden.
 2. 1st Coat: After taping compound is dry, apply coat filling taper flush with surface.
 3. 2nd and 3rd Coats: Spread finish coat evenly over, and extend beyond, previous coat by approximately 3 inches; finish smooth and flush with surface.
 4. Sanding: Where required to achieve acceptable smoothness, exercise care to limit scuffing of paper surface. Use fine textured abrasive products with minimum lap to paper surface.
 5. Butt Joints: At non-recessed butt joints, bevel edges of board approximately 1/8 inch at 45 degree angle and remove loose paper. Finish joint as specified above except finish to width approximately twice that of recessed edge joints.
- I. Finishing: In accordance with GA-214, finish wallboard installations as follows:
1. Typical: Level 4. Joints and interior angles to have tape embedded in joint compound and 3 separate coats of joint compound applied over all joints, angles, fastener heads and accessories. Joint compound to be smooth and free of tool marks and ridges.
 2. Above Finish Ceilings: Level 1. Joints and interior angles to have tape embedded in joint compound. Surface to be free of excess joint compound. Tool marks and ridges are acceptable. Additional finishing required only where required for fire resistance rating.
 3. Mechanical Rooms and Equipment Closets: Level 3. Joints and interior angles to have tape embedded in joint compound and 2 separate coats of joint compound applied over all joints, angles, fastener heads and accessories. Joint compound to be smooth and free of tool marks and ridges.
 4. Critical Lighting Areas: Level 5. See DEFINITIONS in Part 1 above. Joints and interior angles to have tape embedded in joint compound and 3 separate coats of joint compound applied over all joints, angles, fastener heads and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, to be applied to entire surface. Surface to be smooth and free of tool marks and ridges.
- J. Metal Trim: Attach to metal framing with screws. Clinch attachment to wallboard not acceptable. Verify "Metal Corner Bead Backer" installed at corners for double layer board applications; see "Walls" under "Multiple Layers" above.

3.3 CONTROL JOINTS

- A. Provide control joints or other means to isolate gypsum panel surfaces at the following conditions:
1. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
 2. Ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration.
 3. Construction changes within the plane of the partition or ceiling.
 4. Partition or furring run exceeds 30'.
 5. Ceiling dimensions exceed 50' in either direction with perimeter relief, 30' without relief.
 6. Exterior soffits exceed 20' in either direction; align with window mullions.
 7. Wings of "L", "U", and "T"-shaped ceiling areas are joined.
 8. Expansion or control joints occur in the base exterior wall.

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9. Differential Deflection Conditions: All locations where partitions are supported by two or more structural members and subject to differential deflection by live or dead loading:
 - a. Typical Framing Floor to Structure: Provide "Ceiling Deflection Track."
 - b. Framing over One Floor (stairs, shafts, etc.): Provide control joints where studs are interrupted by structure.
 10. Partition terminations at window mullions:
 - a. Neoprene joint tape and caulking installed under Section 09 91 00 - Painting . Coordinate with this Contractor before installation of metal studs.
 11. Door, Window, and Relight Frames Less than Full Height: Provide joints from each corner at each jamb of frames less than ceiling height.
 - a. Provide on both sides of partition.
 - b. Extend joints from top of frame to above ceiling.
 - c. Window and Relight Frames: Extend joints to floor where frames do not extend to floor.
 - d. Above ceiling, only one pair of joints need continue to top of partition.
 - e. Adjacent frames with less than 16 inches space between jambs need joints only at outermost jambs.
 12. Where shown.
- B. Ceiling-height door frames may be used as control joints to comply with straight run requirement, as may less-than-ceiling-height door frames with complying control joints.
- C. Provide framing immediately on both sides of joints and fill cavity with gypsum panel strips or firestopping as required to maintain fire resistance rating and acoustic rating in accordance with manufacturer's tested details.

3.4 ADJUST AND CLEAN

- A. Ridging:
1. Do not repair ridging until condition has fully developed: approximately six months after installation or one heating season.
 2. Sand ridges to reinforcing tape without cutting through tape.
 3. Fill concave areas on both sides of ridge with topping compound.
 4. After fill is dry, blend in topping compound over repaired area.
- B. Fill cracks with compound and finish smooth and flush.

END OF SECTION

SECTION 09 91 00
PAINTING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Paint and finish for all exposed surfaces of project except those specifically excluded. Work includes, but not necessarily limited to, the following:
1. Walls, ceilings and soffits of gypsum board and wood.
 2. Fiberglass doors, frames, transoms, and panels:
 - a. Typical: Factory finished (transparent coating over galvanized steel).
 - b. Where factory finish not required or where specifically Indicated to be field finished: Field finished under this Section.
 3. Wood doors, frames, trim, casework, and millwork (see Divisions 6 and 8 for extent of prefinished work).
 4. Exposed structure including deck and all framing.
 5. Exposed ferrous metal of any type, interior and exterior.
 6. Zinc-based and zinc-aluminum alloy coatings on ferrous metal:
 - a. Typical: Clear satin finish.
 7. Exposed sheet metal, ductwork, conduit, and piping in finished areas, except mechanical equipment rooms not exposed to view.
 8. Exposed prime coated or unfinished mechanical/electrical items outside of mechanical equipment rooms.
 9. Exterior exposed concrete masonry units (C.M.U.) except where such units are pre-finished with integral color.
 10. Exposed wood trim, panels, framing at concessions area.
 11. Where noted or scheduled.
- B. A complete schedule of colors and finishes will be furnished by the Architect.
- C. Paint and finish not required on the following:
1. Items with factory finish or natural finish (brick, stone, stainless steel, aluminum, and others) unless specifically noted elsewhere.
 2. Permanently concealed items, unless noted otherwise.
 3. Wall areas permanently concealed by fixed equipment or accessories.
 4. Where specifically omitted.
 5. Sprayed fireproofing and items receiving sprayed fireproofing in enclosed areas.
 6. Equipment, sheet metal, ductwork, conduit, and piping in mechanical equipment rooms; painting of these items, if required, provided under Divisions 15 and 16 as applicable.
- D. Surface Preparation:
1. It is the intention of this section that new substrates be ready for decoration as specified herein except for normal construction dust and soiling.
 2. New surfaces installed by other trades are required to be acceptable for work under this section which may include work specified under Part 3, Preparation of Surfaces.

Specifically, new surfaces to be clean, sound, free from loose particles, dirt, loose mortar, grease.

3. Existing surfaces, unless otherwise specified, to include under this section all surface preparation required for decoration.

1.02 SUBMITTALS

- A. Submit in accordance with SECTION 01 33 00 - SUBMITTALS.
- B. Samples: Submit complete selection of paint and finish chips indicating color, texture and sheen, for selection and approval by the Architect.
- C. Product Data: Submit complete list of products proposed for use, including manufacturer's data and description of all products and their suitability for intended use for approval by the Architect.
- D. Letter of Acceptance: Submit from USDA (U.S. Department of Agriculture) for any wall coating used in connection with the food service areas. Material(s) use based on "Incidental Food Contact" unless a lesser use rating is specifically allowed by the USDA or local Department of Health having jurisdiction.
- E. Finish Information: Submit data for finishes as required for "Operation and Maintenance Manual" specified under SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA.

1.03 QUALITY ASSURANCE

- A. Applicator to be approved by the Architect and shall, upon request, furnish in writing his qualifications attesting to past satisfactory experience in painting and finishing work of not less than the scope of this project.
 1. Applicator must employ qualified personnel.
 2. Materials to be approved by the Architect.
- B. Single-Source Responsibility: Provide primers and undercoat material produced by the same manufacturer as the finish coats for each type of coating. Use only thinners recommended by the manufacturer and only within recommended limits.
- C. Applicator shall, upon request by the Architect, supply an 8" x 16" sample of each specified paint and finish for approval.
 1. One half of sample to show final finish and other half to show successive steps taken to produce final finish.
 2. Approved samples shall become standard of finish and color to be accepted.
 3. All samples to be labeled on back side with paint manufacturer, type, color, sheen, project name, date, and other relevant information.
- D. Mock-Up: Before proceeding with the work, prepare and finish mock-ups, where directed by the Architect, in accordance with specifications. When approved, these mock-ups shall be standard for workmanship for subsequent similar work. Provide the following mock-ups:
 1. Sample Room: Provide for the pre-dominant substrate used on Project as directed by Architect; i.e. gypsum board or masonry. Minimum room size 150 sq. ft.
 2. Sample Wall(s): Provide as directed by Architect for conditions listed below.
 - a. Secondary substrate. Minimum 100 sq. ft.

- b. "Level 5" finish on gypsum board as specified under Section 09250 - Gypsum Board. Minimum 150 sq. ft. with minimum dimension as directed by Architect.
 3. Metal door and door frame.
 4. Wood door (if job finished doors required) and associated frame.
 5. Exposed Interior Metal Structure: Include structural steel, joists, trusses, and metal deck; at least 100 square feet area. After cure, test field coating for bond to substrates.
- E. Do not proceed with work until samples are approved. Additional coats which may be required to match approved samples shall be applied at no additional cost to Owner.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in original sealed and labeled containers bearing manufacturer's name, brand name, type of material, color designation, and instructions for mixing and thinning.
- B. Store materials in a well ventilated space maintained at a minimum 45 degrees F. Take all precautions to prevent fire.
 1. Keep rubbing cloths and oily rags in tightly closed containers and remove from site daily.
 2. Restrict storage to paint materials and related equipment.
 3. Comply with health and fire regulations.

1.05 PROJECT CONDITIONS

- A. Comply with manufacturer's recommendations as to environmental conditions under which coatings can be applied. Do not apply finish in areas where dust is being generated.
- B. Protect work of other trades from damage and defacement caused by this work, and repair any damage caused by work of this Section.
 1. Provide drop cloths, masking, shields, and protective equipment as required for protection of building surfaces.
 2. Remove electrical outlet and switch plates, mechanical diffusers and grilles, escutcheons, registers, surface hardware, and fittings and fasteners prior to commencing work. Store, clean and replace upon completion.
- C. Environmental Conditions:
 1. Do no exterior painting during or immediately after rain or frost, or when temperature is below 50 degrees F. or likely to drop to freezing, or when surfaces are exposed to hot sun, or likely to be during the drying period, or when temperature is above 90 degrees F.
 2. Do interior work only when building is thoroughly dry, and area of work is properly ventilated and as clean and dust-free as possible.
 - a. Apply interior finishes only when a minimum 60 degrees F. can be maintained during application and drying.
 - b. Maintain 75 degrees F. during application and drying of stains and similar treatments.
- D. Substrate: Apply no coatings for conditions listed below unless otherwise allowed by printed instructions on label for the particular coating.
 1. Substrate is damp.
 2. Substrate is 40 degrees F. or lower.

1.06 EXTRA MATERIALS PAINTING

- A. At completion of job, provide Owner with the following, in sealed original containers:
 - 1. 1 gallon of each color and/or material of finish required for wall finish.
 - 2. 1 quart of each color and/or material of finish required for other surfaces.
 - 3. Store where directed by Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Primary Paints: Specifications based on paint and coating products by The Sherwin-Williams Company. Subject to compliance with requirements, provide products of one of the following:
 - 1. Fuller-O'Brien Paints (Fuller).
 - 2. Benjamin Moore & Co. (Moore).
 - 3. PPG Industries, Inc. (PPG).
 - 4. Pratt & Lambert, Inc. (P & L).
 - 5. Sherwin-Williams Co. (S-W).
 - 6. ICI Dulux Paints.
- B. Specialty Paints: Manufacturers as specified.
 - 1. Exterior Concrete & Masonry, Textured Elastomeric Finish.
 - a. Sonneborn Building Products Div of ChemRex, Inc.
 - b. Thoro Architectural Coatings Div of Harris Specialty Chemicals.
 - 2. Exterior Wood Stain.
 - a. Samuel Cabot, Inc.
 - b. Olympic Paints and Stains.
 - 3. Wood Sealers
 - a. Sherwin-Williams Co. (S-W)
 - b. Fuller-O'Brien Paints (Fuller)

2.02 MATERIALS

- A. Approved products are listed in PAINT AND COATING SCHEDULE below.
 - 1. Select primary products of the coating system from the products of a single manufacturer.
 - 2. Secondary products not specified by name (thinners, mineral spirits, fillers, linseed oils, etc.) shall be "best grade" or "first line" products.
- B. Where gloss or sheen is listed as a standard for approval, the terms refer to tested luster, shine, or sheen of the dry film, and for purposes of this Specification are defined as follows when tested with a 60 degree gloss-meter:
 - 1. Flat; 10 degree gloss or less.
 - 2. Eggshell; 11 to 19 degree gloss.
 - 3. Satin; 20 to 30 degree gloss.
 - 4. Semi-Gloss; 31 to 74 degree gloss.
 - 5. Gloss; 75 degree gloss or more.
- C. Provide paint in various deep and accent colors as selected by the Architect.

1. Include all materials and labor required for cutting in paint of contrasting colors adjacent to each other.
 2. Layout will be furnished by the Architect.
- D. Prohibited Materials: Use no paint for interior work containing tin oxide, regardless whether included in these specifications or not. Submit a statement from the paint manufacturer that no tin oxide exists in any paints used for interior work.

2.03 GENERAL COATING REQUIREMENTS

- A. Color/Sheen Selection:
1. The Architect will furnish a schedule of colors and sheens to be used in the Project, selected from the complete range of Sherwin-Williams colors.
 - a. Obtain schedule prior to commencing work.
 - b. Omissions in the color schedule shall not relieve Contractor from requirements of the Contract Documents.
 2. Provide fifteen percent (15%) area in "deep tones".
 3. Sheen: Architect reserves the right to select sheen(s) from flat, eggshell, or satin from manufacturer's standard range for paint applied to gypsum board and plaster substrates. Such selection to be made during submittal review at no change in price.
- B. Primers: Prime coat specified below will be required on items delivered with prime or shop coats already applied; verify compatibility; provide surface preparation as required.
- C. The specified treatment (as applicable) shall be applied to surfaces as specified under SUMMARY in PART 1 above or indicated on finish schedule and details of drawings.
- D. Coats: The number of coats listed in Schedule is minimum. Contractor to provide additional coats required to achieve coverage acceptable to Architect and at no additional cost to Owner. Coverage to meet or exceed that of approved Mock-up.

2.04 EXTERIOR PAINT AND COATINGS

- A. Exterior Concrete and Unfaced Concrete Masonry (CMU):
1. Textured Elastomeric High Build Acrylic Finish: 2 finish coats.
 - a. 2 Coats "Hydrocide Super ColorCoat VOC" by Sonneborn Building Products Division of ChemRex, Inc or "Thorolastic" by Thoro Architectural Coatings Division of Harris Specialty Chemicals, Inc.
 - b. Dry film thickness: 10 mil per coat)
- B. Exterior Metal: Including exposed portions of structural steel, lintels, steel fittings, railings, air intakes and exhausts, fan housing and goosenecks on roof, and miscellaneous exterior metal work.
1. Latex System, Opaque Finish: 2 finish coats over primer.
 - a. 1st Coat: S-W DTM Acrylic Primer/Finish, B66 Series (Galvanized Metal); 6 mils wet, 3 mils dry)
 - b. 1st Coat: S-W DTM Acrylic Primer/Finish, B66W1 (Ferrous Metal) 6 mils wet, 3 mils dry)
 - c. 2 Coats: S-W DTM Acrylic Gloss Coating, B66 Series; 10 mils wet, 4 mils dry per coat)

- D. Exterior Cement Board Soffits: Latex System
 - 1. 1st Coat: S-W A-100 Exterior Latex Wood Primer, B42W41; 4 mils wet, 1.4 mils dry.
 - 2. 2 Coats: S-W A-100 Exterior Latex Satin, A82 Series; 4 mils wet, 1.4 mils dry/coat.
- E. Exterior Wood: Stained applications
 - 1. Semi-Transparent: 2 coats of Cabot's or Olympic Exterior Wood Stain, semi-transparent stain.
- F. Concessions Area Wood: Sealed applications
 - 1. 2 Coats Sherwin Williams Waterborne Polyurethane Varnish, Satin

2.05 INTERIOR PAINT AND COATINGS

- A. Interior Concrete walls and ceiling surfaces. Latex System.
 - 1. Eg-Shel Finish - Low Odor - Low VOC: 2 finish coats over primer.
 - a. 1st Coat: S-W HealthSpec Low Odor Interior Latex Primer, B11W44
 - b. 2 Coats: S-W HealthSpec Low Odor Interior Latex Eg-Shel, B9 Series
 - 1) 4 mils wet, 1.5 mils dry per coat
- B. Interior Concrete Floors:
 - 1. Sealed Concrete Floors: Typical for all concrete slabs exposed to view, concealed in plenum spaces.
 - a. Provide coordinate final sealer with Owner and verify compatibility with materials specified under Section 03 30 00 for initial curing of floor slabs.
- C. Interior Unfaced Concrete Masonry Units (CMU):
 - 1. Latex system, Eg-Shel Finish - Low Odor - Low VOC 2 finish coats over filler/primer
 - a. 1st Coat: S-W HealthSpec Low Odor Interior Latex Primer, B11W44
 - b. 2 Coats: S-W HealthSpec Low Odor Interior Latex Eg-Shel, B9 Series
 - 1) 4 mils wet, 1.5 mils dry per coat
- D. Interior Metal: Finished and Unfinished areas, including exposed Structural Steel, Lintels, Metal Fabrications, Grilles, , Sheet Metal and other Miscellaneous Metal.
 - 1. Latex system, Semi-Gloss Finish - Low Odor - Low VOC, 2 finish coats over primer
 - a. 1st Coat: S-W DTM Acrylic Primer/Finish, B66W1 (Galvanized)
 - 1) 6 mils wet, 3 mils dry
 - b. 1st Coat: S-W DTM Acrylic Primer/Finish, B66W1 (Ferrous Metal)
 - 1) 6 mils wet, 3 mils dry
 - c. 2 Coats: S-W HealthSpec Low Odor Interior Latex Semi-Gloss, B10 Series
 - 1) 4 mils wet, 1.5 mils dry per coat
- E. Interior Gypsum Board Walls and Ceilings. Sheen: See GENERAL COATING REQUIREMENTS in Part 2 above.
 - 1. Primer: At Contractor's option and risk, one of the following products may be used in lieu of gypsum board system primer specified below.
 - a. "Sheetrock First Coat" by United States Gypsum Co.
 - b. "Pryme 20" by Miracle, Division of Pratt & Lambert Specialty Products.
 - 2. Latex System, Eg-Shel Finish, 2 finish coats over primer.

- a. 1st Coat: S-W PrepRite 200 Latex Primer, B28W200 (Gypsum Board)
 - 1) 4 mils wet, 1.2 mils dry
 - b. 2 Coats: S-W ProMar 200 Latex Eg-Shel, B20W200 Series
 - 1) 4 mils wet, 1.6 mils dry per coat
 3. Latex System, Semi-Gloss Finish, 2 finish coats over primer.
 - a. 1st Coat: S-W PrepRite 200 Latex Primer, B28W200 (Gypsum Board)
 - 1) 4 mils wet, 1.2 mils dry
 - b. 2 Coats: S-W ProClassic Waterborne Acrylic Semi-Gloss, B31 Series
 - 1) 4 mils wet, 1.3 mils dry per coat.
- F. Interior Woodwork: Painted Solid Stock or Veneer; All surfaces except floors.
1. Latex System, Eg-Shel Finish, 2 finish coats over primer.
 - a. 1st Coat: S-W PrepRite Classic Primer, B28W101
 - 1) 4 mils wet, 1.6 mils dry
 - b. 2 Coats: S-W ProMar 200 Latex Eg-Shel, B20W200 Series
 - 1) 4 mils wet, 1.5 mils dry per coat
 2. Latex System, Semi-Gloss Finish, 2 finish coats over primer
 - a. 1st Coat: S-W PrepRite Classic Primer, B28W101
 - 1) 4 mils wet, 1.6 mils dry
 - b. 2 Coats: S-W ProMar 200 Latex Semi-Gloss B31W200 Series
 - 1) 4 mils wet, 1.5 mils dry per coat
- G. Interior Woodwork: Transparent Finished Hardwood Solid Stock or Veneer; All surfaces except floors.
1. Transparent Stained and Varnished Woodwork:
 - a. 1st Coat: S-W Wood Classics Interior Stain, A48-200 Series
 - b. 2nd Coat: S-W Wood Classics FastDry Sanding Sealer, B26V43
 - c. 3rd Coat: S-W Wood Classics FastDry Oil Varnish, Gloss A66-300 Series
 - d. 4th Coat: S-W Wood Classics FastDry Oil Varnish, Satin A66-300 Series
 - 1) 4 mils wet, 1.5 mils dry per coat
 2. Transparent Non-Stained and Varnished (Clear Finish) Woodwork, Typical:
 - a. 1st Coat: S-W Wood Classics FastDry Sanding Sealer, B26V43
 - b. 2nd Coat: S-W Wood Classics FastDry Oil Varnish, Gloss A66-300 Series
 - c. 3rd Coat: S-W Wood Classics FastDry Oil Varnish, Satin A66-300 Series
 - 1) 4 mils wet, 1.5 mils dry per coat
 3. Transparent Non-Stained and Varnished (Clear Finish) Woodwork, Fin Color Ply Hardwood Panels Used At Wall Caps:
 - a. 1st Coat: S-W Wood Classics FastDry Oil Varnish, Gloss A66-300 Series, reduced 25 percent by volume with approved reducer
 - b. 2nd and 3rd Coats: S-W Wood Classics Polyurethane, Gloss A67-300 Series
 - 1) 4 mils wet, 1.5 mils dry per coat
- H. Interior Exposed Piping, Conduit, Canvas Pipe Covering, Pipe Wrapping and Ductwork Coverings
1. All exposed to view piping, conduit, ductwork, hangers and supports (outside of M/E Rooms) to be painted. Painting of mechanical work inside of mechanical equipment rooms and tagging provided under Division 15; see "Mechanical Equipment Rooms" under

SUMMARY in Part 1. Provide pastel colors for ductwork and 100% deep tones for piping; color schedule to be provided by the Architect.

2. Exposed Insulated Pipe and Ductwork: Outside of M/E Rooms
 - a. Latex Systems, Flat Finish, 2 finish coats over primer
 - 1) 1st Coat: S-W PrepRite 200 Latex Primer, B28W200
 - (a) 4 mils wet, 1.2 mils dry
 - 2) 2 Coats: S-W ProMar 200 Latex Flat Wall Paint, B30W200
 - (a) 4 mils wet, 1.4 mils dry per coat
 3. Ferrous Pipe: See Interior Metal coatings. Provide suitable primer for galvanized metals.
 4. Nonferrous Pipe: Not painted.
 5. Foil-Faced Insulation:
 - a. See Interior Metal coatings. Provide suitable primer.

2.06 INTERIOR SPECIAL COATINGS

- A. Interior Painting, Where Scheduled Epoxy: Apply all systems in accordance with manufacturer's recommendations.
- B. Metal Surfaces: Steel
 1. Epoxy Systems (Water Based)
 - a. Gloss Finish
 - 1) 1st Coat: S-W Water Based Catalyzed Epoxy Primer, B70W100 Series
 - 2) 2 Coats S-W Water Based Catalyzed Epoxy, B70W200/B60V15
 - (a)8 mils wet, 3 mils dry per coat
 - b. Semi-Gloss Finish
 - 1) 1st Coat: S-W Water Based Catalyzed Epoxy Primer, B70W100 Series
 - 2) 2 Coats S-W Water Based Catalyzed Epoxy, B70W200/B60V25
 - (a)8 mils wet, 3 mils dry per coat
- C. Concrete and Concrete Masonry Units:
 1. Epoxy System (Water Based)
 - a. Gloss Finish
 - 1) 1st Coat: S-W Heavy Duty Block Filler, B42W46 (Concrete Masonry)
 - (a)87-l08 sq. ft/gal 8-l0 mils dry
 - 2) 2 Coats S-W Water Based Catalyzed Epoxy B70/B60V15
 - (a)8 mils wet, 3 mils dry per coat
 - b. Semi-Gloss Finish
 - 1) 1st Coat: S-W Heavy Duty Block Filler, B42W46 (Concrete Masonry)
 - (a)87-l08 sq. ft/gal 8-l0 mils dry
 - 2) 2 Coats S-W Water Based Catalyzed Epoxy B70/B60V25
 - (a)8 mils wet, 3 mils wet per coat
- D. Gypsum Board:
 1. Epoxy System (Water Based)
 - a. Gloss Finish
 - 1) 1st Coat: S-W PrepRite 200 Latex Primer, B28W200
 - (a)4 mils wet, 1.2 mils dry

- 2) 2 Coats S-W Water Based Catalyzed Epoxy, B70/B60V15
(a)8 mils wet, 3 mils dry per coat
- b. Semi-Gloss Finish
 - 1) 1st Coat: S-W PrepRite 200 Latex Primer, B28W200
(a)4 mils wet, 1.2 mils dry
 - 2) 2 Coats S-W Water Based Catalyzed Epoxy, B70/B60V25
(a)8 mils wet, 3 mils dry per coat

2.07 MECHANICAL/ELECTRICAL SPACES

- A. Provide finishes for mechanical and electrical rooms and closets as listed below.
- B. Spaces Scheduled on Drawings to Receive paint finish:
 1. Walls: Primer and 1 topcoats as specified.
 2. Ceiling (if any): Primer and 1 topcoats as specified unless otherwise scheduled on drawings.
 3. Structure: Coating system as specified unless otherwise scheduled on drawings.
- C. Spaces Not Scheduled on Drawings:
 1. Walls: Primer and 1 topcoat as specified.
 2. Ceiling (if any): Primer and 1 topcoat as specified.
 3. Structure: Coating system as specified.

2.08 MISCELLANEOUS MATERIALS AND FINISH REQUIREMENTS

- A. Finish duct throat surfaces, interior of convector cabinets and other partially visible surfaces (behind louvers, grilles, and registers) as follows:
 1. Prepare and/or prime coat same as for "Interior Metal Work"; see PAINT AND COATING SCHEDULE in Part 2 above.
 2. Apply one (1) coat flat black oil base metal paint.
- B. Provide suitable surface preparation and finish paint for all exposed interior and exterior equipment, air distribution devices, grilles, louvers, piping (including jacketed piping), electrical conduit, and access panels.
 1. Paint to match adjacent surfaces or as otherwise directed.
 2. Include those items with factory applied finishes.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of work, and which cannot be put into an acceptable condition through preparatory work as included in PREPARATION OF SURFACES below.
- B. Do not proceed with surface preparation or coating application until conditions are suitable.

3.02 PREPARATION OF SURFACES

- A. Factory Primed Surfaces:
 - 1. Verify compatibility of existing coating with proposed coatings; provide intermediate coating compatible with both systems if required; remove existing coating by approved methods if compatibility cannot be achieved.
 - 2. Treat damaged or rusted portions of prime coating as specified under metal surfaces below.
 - 3. Clean primed surfaces of all dirt, grease, oil, or other contaminants leaving surface ready to receive scheduled coatings.

- B. Non-Galvanized Ferrous Metal:
 - 1. Prepare surfaces indicated to receive paint finish, leaving clean, dry, and smooth.
 - 2. Solvent clean new surfaces in accordance with SSPC Specification No. 1; remove rust, corrosion, mill scale and other foreign substances by wire brushing and/or sandblasting.
 - 3. Fill any open joints or deep abrasions in factory prime coat with mineral filler, sand smooth and spot prime with type of paint used for shop coat.

- C. Galvanized or Zinc-Coated Metals:
 - 1. Pretreat surfaces prior to application of prime coat with phosphate pretreatment unless prime coat material to be used is recommended by its manufacturer for direct application over zinc treated surfaces of the type at hand. Follow manufacturer's directions.
 - 2. Clean all surfaces receiving directly applied prime coat with mineral spirits, naphtha, or approved solvent.
 - a. Remove all oil, grease, and other film.
 - b. Roughen surface with steel wool as necessary to remove gloss.

- D. Concrete, Concrete Masonry:
 - 1. Prepare surfaces to be clean, dry, and sound.
 - a. Remove loose particles and surface contaminants, including dirt, loose mortar, powder, oil, and grease by wire brush or solvent as required.
 - b. For existing painted surfaces scheduled for repaint, remove scaly or defective paint or finish; smooth exposed edges of finishes by sanding.
 - 2. Cut out and repair cracks and fill irregularities with Portland cement grout to provide uniform surface texture.
 - a. Each exterior surface to be painted with five percent solution (by weight) of muriatic acid.
 - b. Apply no paint or finish to concrete masonry when moisture content exceeds twelve percent.

- E. Gypsum Board:
 - 1. Thoroughly clean surfaces to receive paint or finish.
 - a. Repair all cracks, holes and surface defects.
 - b. Sand smooth, taking care not to raise nap of paper.
 - 2. For existing painted surfaces scheduled for repaint:
 - a. Remove loose or defective paint or finish film and smooth exposed edges by sanding.
 - b. Prime all bare spots.
 - c. Wash painted surfaces with tri-sodium phosphate solution and rinse thoroughly.

F. Wood:

1. Painted Finish:

- a. Clean soiled surfaces (with alcohol wash) and sand to smooth, even surface.
- b. Seal all knots, pitch and resinous sapwood before priming coat is applied, using shellac (not over two pounds cut) on interior surfaces, and spar varnish on exterior surfaces, applied in thin coats.
- c. Putty nail holes and similar face voids in interior work.
- d. Sand smooth when sealer is dry.

2. Non-Stained (Clear) and Stained Finish:

- a. Remove all surface imperfections and stains.
- b. Sand smooth, using 6/0 garnet paper for final sanding.
- c. Putty nail holes and similar face voids after prime sealer coat is dry. Use tinted putty to match stained or clear finish.
- d. Back prime all wood trim and other finished wood items prior to their installation.

G. Factory Primed Surfaces:

1. Verify compatibility of existing coating with proposed coatings; provide intermediate coating compatible with both systems if required; remove existing coating by approved methods if compatibility cannot be achieved.
2. Treat damaged or rusted portions of prime coating as specified under metal surfaces below.
3. Clean primed surfaces of all dirt, grease, oil, or other contaminants leaving surface ready to receive scheduled coatings.

3.03 APPLICATION

A. General: Following surface treatment as specified herein, apply coats or treatments using "highest" quality workmanship by skilled craftsmen.

1. Thin no coating more than specifically recommended by manufacturer.
 - a. Use thinner of recommended type.
 - b. Thin no ready-prepared coating and add no driers unless approved by the Architect.
2. Stir coatings thoroughly and maintain uniform consistency during application.
3. Tint undercoats toward final color with shade of each coat contrasting enough with work in place to permit easy identification.
4. Allow sufficient time between applications to permit proper drying of previous coat.
5. Apply all coatings by brush or roller unless spray application is specified or approved by the Architect.
6. Spread materials evenly, with no runs, sags, laps, brush marks, variation in color, or holidays.
7. Cut sharp lines against glass, other materials, and different colors.
8. Recoat suction spots in first coat on gypsum board as required to produce uniform color and sheen.
9. Remove unfinished doors, finish both faces and all four edges, and rehang.
10. Apply coatings at rates and mil thicknesses specified in manufacturer's published literature.

- B. Prime all gypsum board work as specified; sand lightly and remove all dust and grit before application of primer.
- C. Finishes on Wood or Metal:
 - 1. Sand smooth between coats and remove all dust or grit before next application.
 - 2. Sand wood surfaces in direction of grain only.
- D. Environmental Conditions and Substrate: See JOB CONDITIONS in Part 1 above.
- E. Refinish any work judged defective by the Architect at no additional cost to Owner.

END OF SECTION