

**CONTRACT AND SPECIFICATIONS
for
Bid #08-09 Spinnaker Concrete Repairs**

John P. Bohenko, City Manager
City of Portsmouth, New Hampshire

Prepared by:
City of Portsmouth
Engineering Division
Public Works Department

TABLE OF CONTENTS

INVITATION TO BID	3
INSTRUCTION TO BIDDERS	4
AWARD AND EXECUTION OF CONTRACT	7
PROPOSAL	9
BID BOND	11
BIDDER'S QUALIFICATIONS	12
CONTRACT AGREEMENT	14
NOTICE OF INTENT TO AWARD	17
NOTICE TO PROCEED	18
CHANGE ORDER	19
LABOR AND MATERIALS PAYMENT BOND	20
CONTRACTOR'S AFFIDAVIT	23
CONTRACTOR'S RELEASE	24
INSURANCE REQUIREMENTS	26
GENERAL CONDITIONS	27
TECHNICAL SPECIFICATIONS and DRAWINGS	32

BID #08-09

City of Portsmouth
Portsmouth, New Hampshire
Department of Public Works

Spinnaker Concrete Repairs

INVITATION TO BID

Sealed bid proposals, **plainly marked**, “**Bid #08-09 Spinnaker Concrete Repairs** “ **on the outside of the mailing envelope as well as the sealed bid envelope**, addressed to the Finance/Purchasing Department, City Hall, 1 Junkins Avenue, Portsmouth, New Hampshire, 03801, will be accepted until **Wednesday, April 1, 2009 at 3:30 p.m.**; at which time all bids will be publicly opened and read aloud.

The City is seeking contractors to provide drainage and concrete repairs to the Spinnaker Recreation building. The work shall consist of removing and replacing selected areas of concrete walk and stairs at the front entry.

There will be a mandatory on site pre-bid meeting on 2:00 PM Friday, March 20, 2009 Contractors are to gather outside the Spinnaker Point Recreation Center entrance, 30 Spinnaker Way, Portsmouth NH.

Specifications and bid proposal forms may be obtained from the Finance/Purchasing Department on the third floor at the above address, or at www.cityofportsmouth.com. Procedural questions contact the Finance/Purchasing Department at 603-610-7227. Technical questions should be directed to Dan Hartrey at 610-7299.

Completion date will be 90 calendar days from the date of the Notice to Proceed. Liquidated damages shall be assessed at \$100.00 per day.

Bidders must determine the quantities of work required and the conditions under which the work will be performed.

The City of Portsmouth reserves the right to reject any or all bids, to waive technical or legal deficiencies, and to accept any bid that it may deem to be in the best interest of the City.

Each Bidder shall furnish a bid security in the amount of ten percent (10%) of the bid. The Bid Security may be in the form of a certified check drawn upon a bank within the State of New Hampshire or a bid bond executed by a surety company authorized to do business in the State of New Hampshire, made payable to the City of Portsmouth, N.H.

INSTRUCTIONS TO BIDDERS**BIDDING REQUIREMENTS AND CONDITIONS****1. Special Notice to Bidders**

Appended to these instructions is a complete set of bidding and general contract forms. These forms may be detached and executed for the submittal of bids. The plans, specifications, and other documents designated in the proposal form will be considered as part of the proposal, whether attached or not.

The bidders must submit a statement of bidder's qualifications.

2. Interpretation of Quantities in Bid Schedules

The quantities appearing in the bid schedule are approximate only and are prepared for the comparison of bids. Payment to the contractor will be made only for actual work performed and accepted in accordance with the contract. Any scheduled item of work to be done and materials to be furnished may be increased, decreased or omitted as hereinafter provided, and no claim for loss, anticipated profits or costs incurred in anticipation of work not ultimately performed will be allowed due to such increase or decrease.

3. Examination of Plans, Specifications and Site Work

The bidder is expected to examine carefully the site of the proposed work, the plans, specifications, special provisions and contract forms before submitting a proposal. Dimensions and elevations indicated on the drawings in reference to existing structures or utilities are the best available data obtainable but are not guaranteed by the Owner or the Owner's Representative. Before bidding on any work dependent upon the data involved, the Contractor shall field check and verify all dimensions, grades, lines, levels or other conditions of limitations at the site to avoid construction errors.

The submission of a bid shall be considered conclusive 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. It will be conclusive evidence that the bidder has also investigated and is satisfied with the sources of supply for all materials.

If the Contractor feels a conflict exists between what is considered good roofing practice and these specifications, he/she shall state in writing all objections prior to submitting quotations.

4. Familiarity with Laws

The bidder is assumed to have made himself or herself familiar with all federal and state laws and all local by-laws, ordinances and regulations which in any manner affect those engaged or employed on the work or affect the materials or equipment used in the work or affect the conduct of the work, and the bidder, if awarded the contract, shall be obligated to perform the work in conformity with said laws, by-laws, ordinances and regulations notwithstanding its ignorance thereof. If the bidder shall discover any provision in the plans or specifications which is in conflict with any such law, by-law, ordinance or regulation the bidder shall forthwith report it to the engineer in writing.

5. Preparation of Proposal

a) The bidder shall submit its proposal upon the forms furnished by the Owner. The bidder shall specify a lump sum price in figures, for each pay item for which a quantity is given and shall also show the products of the respective prices and quantities written in figures in the column provided for that purpose and the total amount of the proposal obtained by adding the amount of the several items. All words and figures shall be in ink or typed.

If a unit price or a lump sum bid already entered by the bidder on the proposal form is to be altered it should be crossed out with ink, the new unit price or lump sum bid entered above or below it and initialed by the bidder, also with ink.

b) The bidder's proposal must be signed with ink by the individual, by one or more general partners of a partnership, by one or more members or officers of each firm representing a joint venture; by one or more officers of a corporation, by one or more members (if member-managed) or managers (if manager-managed) of a limited liability company, or by an agent of the contractor legally qualified and acceptable to the owner. If the proposal is made by an individual, his or her name and post office address must be shown, by a partnership the name and post office address of each general and limited partner must be shown; as a joint venture, the name and post office address of each venturer must be shown; by a corporation, the name of the corporation and its business address must be shown, together with the name of the state in which it is incorporated, and the names, titles and business addresses of the president, secretary and treasurer.

6. Nonconforming Proposals

Proposals will be considered nonconforming and may be rejected in the Owner's sole discretion for any of the following reasons:

- If the proposal is on a form other than that furnished by the Owner, or if the form is altered or any portion thereof is detached;
- If there are unauthorized additions, conditional or altered bids, or irregularities of any kind which may tend to make the proposal or any portion thereof incomplete, indefinite or ambiguous as to its meaning;
- 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; or
- If the proposal does not contain a unit price for each pay item listed except in the case of authorized alter pay items.

7. Proposal Guaranty

No proposal will be considered unless accompanied by a bid bond, surety, or similar guaranty of the types and in an amount not less than the amount indicated in the Invitation to Bid. All sureties shall be made payable to the "City of Portsmouth". If a bid bond is used by the bidder it shall be:

- In a form satisfactory to the Owner;
- With a surety company licensed, authorized to do business in, and subject to the jurisdiction of the courts of the State of New Hampshire; and
- Conditioned upon the faithful performance by the principal of the agreements contained in the sub-bid or the general bid.

In the event any irregularities are contained in the proposal guaranty, the bidder will have four business days (not counting the day of opening) to correct any irregularities. The corrected guaranty must be received by 4:00 p.m. If irregularities are not corrected to the satisfaction of the Owner, the Owner, in its sole discretion, may rejected the bid.

8. Delivery of Proposals

When sent by mail, the sealed proposal shall be addressed to the Owner at the address and in the care of the official in whose office the bids are to be received. All proposals shall be filed prior to the time and at the place specified in the invitation for bids. Proposals received after the time for opening of the bids will be returned to the bidder, unopened.

9. Withdrawal of Proposals

A bidder will be permitted to withdraw his or her proposal unopened after it has been submitted if the Owner receives a request for withdrawal in writing prior to the time specified for opening the proposals.

10. Public Opening of Proposals

Proposals will be opened and read publicly at the time and place indicated in the invitation for bids. Bidders, their authorized agents, and other interested parties are invited to be present.

11. Disqualification of Bidders

Any or all of the following reasons may be deemed by Owner in its sole discretion as being sufficient for the disqualification of a bidder and the rejection of his proposal:

- More than one proposal for the same work from an individual, firm, or corporation under the same or different name;
- Evidence of collusion among bidders;
- Failure to submit all required information requested in the bid specifications;
- Lack of competency or of adequate machinery, plant or other equipment, as revealed by the statement of bidders qualification or otherwise;
- Uncompleted work which, in the judgment of the owner, might hinder or prevent the prompt completion of additional work if awarded;
- Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts;
- Default or unsatisfactory performance on previous contracts; or
- Such disqualification would be in the best interests of the Owner.

12. Material Guaranty and Samples

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, and the Owner may, in its sole discretion, reject the bid based on the contents of the statement or as a result of the failure of the bidder to submit the statement.

13. Discrepancies And Addenda

- A. Should a Bidder find any discrepancies in the Specifications, or should he/she be in doubt as to their meaning, he/she shall notify the Owner at once, who will send a written Addendum to all Bidders concerned. Oral instructions or decisions, unless confirmed by Addenda, will not be considered valid, legal or binding.
- B. No extras will be authorized because of the Bidder's failure to include work called for in the Addenda in his/her bid.

AWARD AND EXECUTION OF CONTRACT

1. Consideration of Proposals

a) After the proposals are opened and read, they will be compared on the basis of the total price for all sections of work to be charged to perform the work and any such additional considerations as may be identified in the bid documents. The results of such comparisons will be immediately available to the public. In case of a discrepancy between the prices written in words and those written figures, the prices written in words shall govern. In case of a discrepancy between the total shown in the proposal and that obtained by adding the products of the quantities of items and unit bid prices, the latter shall govern.

b) The Owner reserves the right to reject any or all proposals, to waive technicalities or to advertise for new proposals, if, in the sole discretion of the Owner, the best interest of the City of Portsmouth will be promoted thereby.

2. Award of Contract

Within 30 calendar days after the opening of proposals, if a contract is to be awarded, the award will be made to the lowest responsible and qualified bidder whose proposal complies with all the requirements prescribed. The successful bidder will be notified, in writing, mailed to the address on his or her proposal, that his or her bid has been accepted and that the bidder has been awarded the contract.

3. Cancellation of Award

The Owner reserves the right to cancel the award of any contract at any time before the execution of such contract by all parties without any liability of the Owner.

4. Return of Proposal Guaranty

All proposal guaranties, except those of the three lowest bidders, will be returned upon request following the opening and checking of the proposals. The proposal guaranties of the three lowest bidders will be returned within ten days following the award of the contract if requested.

5. Contract Bond

At the time of the execution of the contract, the successful bidder shall furnish:

- Labor and materials/payment bond in the sum equal to 100 percent of the contract amount.
- At the time of project completion, Contractor shall supply a maintenance bond in an amount equal to 20 percent of the contract amount. Such bond shall guarantee the repair of all damage due to faulty materials or workmanship provided or done by the contractor. The guarantee shall remain in effect for a period of **one year** after the date of final acceptance of the job by the Owner.

Each bond shall be: (1) in a form satisfactory to the Owner; (2) with a surety company licensed and authorized to do business and with a resident agent designated for services of process in the State of New Hampshire; and (3) conditioned upon the faithful performance by the principal of the agreements contained in the original bid. All premiums for the contract bonds are to be paid by the contractor.

6. Execution and Approval of Contract

The successful bidder is required to present all contract bonds, to provide proof of insurance, and to execute the contract within 10 days following receipt of the City's notification of acceptance of the bid. No contract shall be considered as in effect until it has been fully executed by all parties.

7. Failure to Execute Contract

Failure to execute the contract and file an acceptable bond within 10 days after notification of acceptance of bid shall be just cause for the cancellation of the award and the forfeiture of the proposal guarantee which shall become the property of the Owner, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest responsible bidder, or the work may be re-advertised as the Owner may determine in its sole discretion.

PROPOSAL FORM

Bid #08-09 Spinnaker Concrete Repairs

CITY OF PORTSMOUTH, N.H.

To the City of Portsmouth, New Hampshire, herein called the Owner.

The undersigned, as Bidder, herein referred to as singular and masculine declares as follows: 1. All interested in the Bid as Principals are named herein.

2. This bid is not made jointly, or in conjunction, cooperation or collusion with any other person, firm, corporation, or other legal entity;

3. No officer, agent or employee of the Owner is directly or indirectly interested in this Bid.

4. The bidder has carefully examined the site of the proposed work and fully informed and satisfied himself as to the conditions there existing, the character and requirements of the proposed work, the difficulties attendant upon its execution and the accuracy of all estimated quantities stated in this Bid, and the bidder has carefully read and examined the Drawings, Agreement, Specifications and other Contract Documents therein referred to and knows and understands the terms and provisions thereof;

5. The bidder understands that the quantities of work calculated in the Bid or indicated on the Drawings or in the Specifications or other Contract Documents are approximate and are subject to increase or decrease or deletion as deemed necessary by the Portsmouth City Engineer. Any such changes will not result in or be justification for any penalty or increase in contract prices; and agrees that, if the Bid is accepted the bidder will contract with the Owner, as provided in the Contract Documents, this Bid Form being part of said Contract Documents, and that the bidder will supply or perform all labor, services, machinery, apparatus, tools, supplies and all other activities required by the Contract Documents in the manner and within the time therein set forth, and that the bidder will take in full payment therefor the following item prices, to wit:

THIS PROJECT SHALL BE BID BY LUMP SUM.

1. Remove and replace concrete entrance and stairs, per specifications and drawings.

Price in Words \$ _____

Price in Figures \$ _____

2. Furnish and install a french drain in areas indicated on drawing.

Price in Words \$ _____

Price in Figures \$ _____

Total Price of 1.and 2. (Basis of Award)

Price in Words \$ _____

Price in Figures \$ _____

PROPOSAL FORM (Continued)

The undersigned agrees that for extra work, if any, performed in accordance with the terms and provisions of the Contract Documents, the bidder will accept compensation as stipulated therein.

_____ Date

_____ Company

By: _____
Print Name

By: _____
Signature

Title: _____

_____ Business Address

_____ City, State, Zip Code

Telephone: _____

The Bidder has received and acknowledged Addenda No. _____ through _____.
All Bids are to be submitted on this form and in a sealed envelope, plainly marked on the outside with the Bidder's name and address and the Project name as it appears at the top of the Proposal Form.

BID SECURITY BOND

(This format provided for convenience, actual Bid Bond is acceptable in lieu of, if compatible.)

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned

_____, as Principal, and _____, as Surety, are hereby held and firmly bound unto the City of Portsmouth IN THE SUM OF _____ as liquidated damages for 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 this obligation is such that whereas the Principal has submitted to the City of Portsmouth A CERTAIN Bid attached hereto and hereby made a part hereof to enter into a contract in writing, hereinafter referred to as the "AGREEMENT" and or "CONTRACT", for

NOW THEREFORE,

(a) If said Bid shall be rejected or withdrawn as provided in the INFORMATION FOR BIDDERS attached hereto or, in the alternative,

(b) If this Bid shall be accepted and the Principal shall duly execute and deliver the form of AGREEMENT attached hereto and shall furnish the specified bonds for the faithful performance of the AGREEMENT and/or CONTRACT and for the payment for labor and materials furnished for the performance of the AGREEMENT and or CONTRACT,

then this obligation shall be void , otherwise it 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 in no event shall exceed the amount of this obligation.

The Surety, for value received, hereby agrees that the obligation of said surety and its bond shall be in no way impaired or affected by any extensions of the time within such BID may be accepted, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the parties hereto have duly executed

this bond on the _____ day of _____, 20__.

(Name of Principal) L.S.

(SEAL)

BY _____

(Name of Surety)

BY _____

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. Add separate sheets if necessary. **This statement to be submitted with Bid.**

1. Name of Bidder
2. Permanent Main Office Address
3. Form of Entity
4. When Organized
5. Where Organized
6. How many years have you been engaged in the contracting business under your present name; also state names and dates of previous firm names, if any.
7. Contracts on hand; (schedule these, showing gross amount of each contract and the approximate anticipated dates of completion).
8. General character of work performed by your company.
9. Have you ever failed to complete any work awarded to you? ____ (no) ____ (yes). If so, where and why?
10. Have you ever defaulted on a contract?
____ (no) ____ (yes). If so, where and why?
11. Have you ever failed to complete a project in the time allotment according to the Contract Documents?
____ (no) ____ (yes). If so, where and why?
12. List the most important contracts recently executed by your company, stating approximate cost for each, and the month and year completed.
13. List your major equipment available for this contract.
14. List your key personnel such as project superintendent and foremen available for this contract.
15. Identify door systems that you are approved to install by the manufacturer.
 - a. _____
 - b. _____
15. List any subcontractors and trade whom you would expect to use (unless this work is to be done by your own organization).
 - a. _____

b. _____

c. _____

The City reserves the right to request financial statements, certified audited if available, prepared by an independent certified public accountant.

Dated at _____ this _____ day of _____, 20__.

Name of Bidder

BY _____

TITLE _____

State of _____

County of _____

_____ being duly sworn, deposes and

says that the bidder is _____ of _____
(Name of Organization)

and answers to the foregoing questions and all statements contained therein are true and correct.

Sworn to before me this ____ day of _____, 20__.

Notary of Public

My Commission expires

CONTRACT AGREEMENT

Bid #08-09 Spinnaker Concrete Repairs

THIS AGREEMENT made as of the ____ day of ____ in the year **2009**, by and between the City of Portsmouth, New Hampshire (hereinafter call the Owner) and _____ (hereinafter called the Contractor),

WITNESSETH; that the Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE I - WORK - The Contractor shall perform all work as specified or indicated in the Contract Documents for the completion of the Project. The Contractor shall provide, at his expense, all labor, materials, equipment and incidentals as may be necessary for the expeditious and proper execution of the Project.

ARTICLE II - CONTRACT TIME - The work will commence in accordance with the Notice to Proceed and be completed within 90 days of the Notice to Proceed.

ARTICLE III - CONTRACT PRICE - Owner shall pay Contractor for performance of the work in accordance with the Contract Documents as shown under item prices in the Bid Proposal.

ARTICLE IV - PAYMENT - Partial payments will be made in accordance with the Contract Documents, which may include the withholding of retainage. Upon final acceptance of the work and settlement of all claims, Owner shall pay the Contractor the unpaid balance of the Contract Price, subject to additions and deductions provided for in the Contract Documents.

ARTICLE V - LIQUIDATED DAMAGES - In event the Contractor fails to successfully execute the work within the specified contract time the Owner shall assess the Contractor liquidated damages in the amount of **One Hundred Dollars** (\$100) for each calendar day beyond the specified completion date. The liquidated damages shall be deducted from the Contract Price prior to final payment of the Contractor.

ARTICLE VI - CONTRACT DOCUMENTS - The Contract Documents which comprise the contract between Owner and Contractor are attached hereto and made a part hereof and consist of the following:

- 6.1 This Agreement
- 6.2 Contractor's Bid and Bonds
- 6.3 Notice of Award, Notice to Proceed
- 6.4 Instruction to Bidders
- 6.5 Insurance Requirements
- 6.6 General Conditions
- 6.7 Special Provisions
- 6.8 Technical Specifications

6.9 Drawings

6.10 Any modifications, including change orders, duly delivered after execution of this Agreement

ARTICLE VII - TERMINATION FOR DEFAULT - Should contractor at any time refuse, neglect, or otherwise fail to supply a sufficient number or amount of properly skilled workers, materials, or equipment, or fail in any respect to prosecute the work with promptness and diligence, or fail to perform any of its obligations set forth in the Contract, Owner may, at its election, terminate the employment of Contractor, giving notice to Contractor in writing of such election, and enter on the premises and take possession, for the purpose of completing the work included under this Agreement, of all the materials, tools and appliances belonging to Contractor, and to employ any other persons to finish the work and to provide the materials therefore at the expense of the Contractor.

ARTICLE VIII - INDEMNIFICATION OF OWNER - Contractor will indemnify Owner against all suits, claims, judgments, awards, loss, cost or expense (including without limitation attorneys fees) arising in any way out of the Contractor's negligent performance of its obligations under this Contract. Contractor will defend all such actions with counsel satisfactory to Owner at its own expense, including attorneys' fees, and will satisfy any judgment rendered against Owner in such action.

ARTICLE IX – PERMITS AND COMPLIANCE WITH LAWS - The Contractor will secure at its own expense, all permits and consents required by law as necessary to perform the work and will give all notices and pay all fees and otherwise comply with all applicable City, State, and Federal laws, ordinances, rules and regulations.

ARTICLE XIII - INSURANCE - The Contractor shall secure and maintain, until acceptance of the work, insurance with limits not less than those specified in the Contract.

ARTICLE XIII - MISCELLANEOUS -

13.1 Neither Owner nor Contractor shall, without the prior written consent of the other, assign, sublet or delegate, in whole or in part, any of its rights or obligations under any of the Contract Documents; and, specifically not assign any monies due, or to become due, without the prior written consent of Owner.

13.2 Contractors and subcontractors shall not discriminate against any employees or applicant for employment, to be employed in performance of his/her contract, with respect to his/her hire, tenure, terms, conditions or privileges of employment because of his/her race, color, gender, sexual preference, religion, national origin, or ancestry.

13.3 Owner and Contractor each binds himself, his partners, successors, assigns and legal representatives, to the other party hereto in respect to all covenants, agreements and obligations contained in the Contract Documents.

13.4 The Contract Documents constitute the entire Agreement between Owner and Contractor and may only be altered amended or repealed by a duly executed written instrument.

IN WITNESS WHEREOF, the parties hereunto executed this

AGREEMENT the day and year first above written.

NAME OF BUSINESS

BY: _____

TITLE: _____

ATTEST: _____

(SEAL)

CITY OF PORTSMOUTH, N.H.

BY: _____
John P. Bohenko

TITLE: City Manager

ATTEST: _____

(SEAL)

NOTICE OF INTENT TO AWARD

Date:

TO:

IN AS MUCH as you were the low responsible bidder for work entitled:

Bid #08-09 Spinnaker Concrete Repairs

In the City of Portsmouth, New Hampshire, you are hereby notified that the City intends to award the aforesaid project to you.

You are further instructed to immediately take the necessary steps for execution of the Contract within ten (10) calendar days from the date of this Notice.

You must deliver to the Owner certificates of insurance and required bonds in accordance with the Contract Documents with the executed Contract. The City reserves the right to revoke this Notice if you fail to take the necessary steps to execute this Contract.

City of Portsmouth
Portsmouth, New Hampshire

Judie Belanger,
Finance Director

NOTICE TO PROCEED

DATE:

PROJECT: **Bid #08-09 Spinnaker Concrete Repairs**

TO:

YOU ARE HEREBY NOTIFIED TO COMMENCE WORK IN ACCORDANCE WITH THE AGREEMENT DATED _____.

ALL WORK SHALL BE COMPLETED WITHIN 90 DAYS OF THE DATE OF THIS NOTICE.

CITY OF PORTSMOUTH, N.H.

BY _____

TITLE_

ACCEPTANCE OF NOTICE

RECEIPT OF THE ABOVE NOTICE TO PROCEED IS HEREBY ACKNOWLEDGED BY

This the _____ day of _____ 20__

By: _____

Title: _____

CHANGE ORDER

Change Order Number _____ Date of Issuance _____

Owner:

Contractor:

You are directed to make the following changes in the Contract Documents:

Description:

Purpose of Change Order:

Attachments:

CHANGE IN CONTRACT PRICE

CHANGE IN CONTRACT TIME

Original Contract Price:
\$ _____

Original Contract Time:
_____ days

Contract Price prior to this
Change Order:
\$ _____

Contract Time prior to this
Change Order:
_____ days

Net Increase or Decrease of
this Change Order:
\$ _____

Net Increase or Decrease of
this Change Order:
_____ days

Contract Price with all
approved Change Orders:
\$ _____

Contract Time with all
approved Change Orders:
_____ days

RECOMMENDED:

APPROVED:

APPROVED:

by _____

by _____

by _____

by _____

City Engineer

City Finance

City Manager

Contractor

LABOR AND MATERIAL PAYMENT BOND

(This format provided for convenience, actual Labor and Material Bond is acceptable in lieu, if comparable)

Bond Number _____

KNOW ALL MEN BY THESE PRESENTS:

that _____

as Principal, hereinafter called Contractor, and _____ (Surety Company) a corporation organized and existing under the laws of the State of

_____ and authorized to do business in the State of New Hampshire hereinafter called Surety, are held and firmly bound unto the City of Portsmouth, NH. Obligee, hereinafter called Owner, for the use and benefit of claimants as herein below defined, in the

amount of _____ Dollars (\$ _____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a contract with Owner for _____ in accordance with drawings and specifications prepared by the City of Portsmouth, 1 Junkins Avenue, Portsmouth, NH 03801, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract and for the hire of all equipment, tools, and all other things contracted for or used in connection therewith, then this obligation shall be void, otherwise it shall remain in full force and effect, subject however, to the following conditions:

(1) A claimant is defined as one having a direct contract with the Principal or, with a subcontractor of the Principal for labor, material, equipment, or other things used or reasonably required for use in the performance of the Contract. "Labor and material" shall include but not be limited to that part of water, gas, power, light, heat, oil and gasoline, telephone service or rental of equipment applicable to the Contract.

(2) The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such a claimant, may sue on this bond for the use of such claimant, prosecute the suit by final judgment for such sum or sums as may be

LABOR AND PAYMENT BOND (continued)

justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any such suit or any costs or expenses of any such suit, and principal and surety shall jointly and severally indemnify, defend and hold the Owner harmless for any such suit, costs or expenses.

(3) No suit or action shall be commenced hereunder by any claimant:

(a) Unless Claimant, other than one having a direct contract with the Principal, shall have given notice to all the following:

The Principal, the Owner and the Surety above named, within six (6) calendar months after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State of New Hampshire save that such service need not be made by a public officer.

(b) After the expiration of one (1) year following the date on which Principal ceased all work on said contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

(c) Other than in a State court of competent jurisdiction in and for the county or other political subdivision of the State in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere. (4) The amount of this bond may be reduced by and to the extent of any payment of payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed on record against said improvement, whether or not claim for the amount of such lien by presented under and against this bond.

Signed and sealed this _____ day of _____, 20____. In the presence of:

(Witness) BY: _____
(Principal) (Seal)

(Surety Company)

(Witness) BY: _____
(Title) (Seal)

Note:

If the Principal (Contractor) is a partnership, the Bond should be signed by each of the partners. If the Principal (Contractor) is a corporation, the Bond should be signed in its correct corporate name by its duly authorized Officer or Officers. If this bond is signed on behalf of the Surety by an attorney-in-fact, there should be attached to it a duly certified copy of his Power of Attorney showing his authority to sign such Bonds. There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Agreement.

CONTRACTOR'S AFFIDAVIT

STATE OF _____:

COUNTY OF _____:

Before me, the undersigned, a _____
(Notary Public, Justice of the Peace)

in and for said County and State personally appeared, _____
(Individual, Partner, or duly authorized representative of Corporate)

who being duly sworn according to law deposes and says

that the cost of labor, material, and equipment and

outstanding claims and indebtedness of whatever nature

arising out of the performance of the Contract between

CITY OF PORTSMOUTH, NEW HAMPSHIRE

and _____
(Contractor)

of _____

Dated: _____

has been paid in full for: **Bid #08-09 Spinnaker Concrete Repairs**

(Individual, Partner, or
duly authorized
representative of
Corporate Contractor)

Sworn to and subscribed
before me this _____ day
of _____ 20 ____

CONTRACTOR'S RELEASE

KNOW ALL MEN BY THESE PRESENTS that

(Contractor) of _____, County of _____ and
State of _____ do hereby acknowledge
that _____ (Contractor)

has on this day had, and received from the

CITY OF PORTSMOUTH NEW HAMPSHIRE, final and completed payment for:
Bid #08-09 Spinnaker Concrete Repairs

NOW THEREFORE, the said _____

(Contractor)

for myself, my heirs, executors, and administrators) (for itself, its successors and assigns) do/does by these presents remise, release, quit-claim and forever discharge the City of Portsmouth, New Hampshire, its successors and assigns, of and from all claims and demands arising from or in connection with the said Contract dated _____, and of and from all, and all manners of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money, accounts, reckonings, bonds, bills, specifications, covenants, contracts, agreements, promises, variances, damages, judgments, extents, executions, claims and demand, whatsoever in law of equity, or otherwise, against the City of Portsmouth, New Hampshire, its successors and assigns, which (I, my heirs, executors, or administrators) (it, its successors and assigns) ever had, now have or which (I, my heirs, executors, or administrators) (it, its successors and assigns) hereafter can shall or may have, for, upon or by reason of any matter, cause, or thing whatsoever; from the beginning of record time to the date of these presents.

CONTRACTOR'S RELEASE (continued)

IN WITNESS WHEREOF, _____

(Contractor)

has caused these presents to be duly executed this _____
_____ day of _____, 20__.

Signed, Sealed and Delivered
in the presence of:

(Individual-Contractor) (Seal)

(Partnership-Contractor) (Seal)

(Partner) BY _____ (Seal)

Attested: _____
(Corporation)

(Secretary) BY _____
(President or Vice President)

(Corp. Seal)

INSURANCE REQUIREMENTS

Insurance shall be in such form as will protect the Contractor from all claims and liabilities for damages for bodily injury, including accidental death, and for property damage, which may arise from operations under this contract whether such operation by himself or by anyone directly or indirectly employed by him.

AMOUNT OF INSURANCE

- A) Comprehensive General Liability:
Bodily injury or Property Damage - \$2,000,000
Per occurrence and general aggregate
- B) Automobile and Truck Liability:
Bodily Injury or Property Damage - \$2,000,000
Per occurrence and general aggregate

Coverage amounts can be met through excess policies

Additionally, the Contractor shall purchase and maintain the following types of insurance:

- A) Workers Comprehensive Insurance coverage for all people employed by the Contractor to perform work on this project. This insurance shall at a minimum meet the requirements of the most current laws of the State of New Hampshire.
- B) Contractual Liability Insurance coverage in the amounts specified above under Comprehensive General Liability.
- C) Product and Completed Operations coverage to be included in the amounts specified above under Comprehensive General Liability.
- D) Builders' Risk

ADDITIONAL INSURED

All liability policies (including any excess policies used to meet coverage requirements) shall include the City of Portsmouth, New Hampshire as named Additional Insured.

- 1) The contractor's insurance shall be primary in the event of a loss.
- 2) The Additional Insured endorsement must include language specifically stating that the entity is to be covered for all activities performed by, or on behalf of, the contractor, including the City of Portsmouth's general supervision of the contractor.
- 3) City of Portsmouth shall be listed as a Certificate Holder. The City shall be identified as follows:

City of Portsmouth
Attn: Legal Department
1 Junkins Avenue
Portsmouth, NH 03801

GENERAL CONDITIONS

PART 1 - GENERAL

1.1 DEFINITIONS

- A. The term Owner shall be understood to be the City of Portsmouth.

1.2 PROTECTION OF OWNER'S OPERATIONS

- A. The Contractor shall erect such barriers, tarpaulins, doors, etc., as may be necessary to protect the Owner's operations while work is in progress. Any such openings that are essential to carrying on the work shall be securely closed by the Contractor when not in use to protect the Owner's operations.

1.3 PROTECTION OF WORK AND PROPERTY

- A. The Contractor shall maintain adequate protection of all his/her work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He/she shall provide and maintain at all times any danger signs, guards and/or obstructions necessary to protect the public and his/her workmen from any dangers inherent with or created by the work in progress. He/she shall hold the Owner harmless from any loss arising due to injury or accident to the public or his/her workmen, or from theft of materials stored at the job site.
- B. Any areas of the building or grounds which have become damaged in any way shall be repaired or replaced by the Contractor prior to the final inspections. The method of repair used must be acceptable to the Owner.

1.4 MATERIAL STORAGE AND CLEAN-UP

- A. The Contractor shall keep the premises free from rubbish at all times and shall arrange his/her material storage so as not to interfere with the Owner's operations. At the completion of the job, all the unused material and rubbish shall be removed from the site. The building shall be broom cleaned. If the Contractor refuses at any time to remove his/her debris from the premises, or to keep the working area clean, such cleaning will be completed by the Owner and deducted from the balance due the Contractor.
- B. Materials must be delivered with manufacturer's label in tact and legible. Labels must be affixed to the outside of the package stating the type of product, name and address of the manufacturer. All materials shall be stored and protected against weather, vandalism, and theft. Any materials found to be damaged or missing shall be replaced by the Contractor at no cost to the Owner.

1.5 INSPECTION OF WORK

- A. Where the drawings or specifications require the inspection and approval of any work in progress by the Owner, the Contractor shall give that Representative ample notice to allow for scheduling the inspection, which shall be made promptly to avoid delay of work. If work has progressed without the required inspections or approval by the Representative, it shall be uncovered for inspection at the Contractor's expense.
- B. Uncovering of work not originally inspected, or uncovering questioned work may be ordered by the Owner and it shall be done by the Contractor. If examination proves such work to be

incorrectly done or not done in accordance with the plans and specifications, the Contractor shall bear all cost of the reexamination. If the work is proven correctly installed, all such expense shall be born by the Owner.

1.6 INSPECTION OF WORK IN PROGRESS AND UPON COMPLETION

- A. Noncompliance with the terms of this specification and ensuing contract can result in either the cancellation of the contract, or complete replacement of the defective areas at the Contractor's expense. In the event of cancellation, the Owner will not be obligated to compensate the Contractor for any work undertaken in a defective manner.
- B. Damages caused by water infiltration resulting from the failure of the Contractor to secure each day's work in a weather tight manner, will be corrected at the Contractor's expense. Included as damages will be all labor costs incurred by the Owner as a result of such water infiltration.
- C. The Owner will examine the work in progress, as well as upon completion, in order to ascertain the extent to which the materials and procedures conform to the requirements of these specifications and to the published instructions of the Manufacturer.
- D. The Owner shall be responsible for:
 - 1. Calling to the attention of the Contractor those matters he/she considers to be in violation of the contract requirements;
 - 2. Certifying, after completion of the work, the extent to which the Contractor has complied with these specifications as well as to the published instructions of the Manufacturing Company.
- E. A final inspection shall be conducted by Owner upon being notified of completion of specified work and clean-up.

1.7 MISCELLANEOUS UTILITIES

- A. Electrical power will be furnished by the Owner for small tools only. All connections to the electrical system will be furnished by the Contractor.
- B. Water for concrete, mortar, washing and drinking purposes will be furnished by the Owner. Any connections to the water system shall be completed by the Contractor.
- C. At the completion of the work, or when the above connections are no longer required, the Contractor shall remove all connections and leave the facilities in a condition at least as satisfactory as prior to the commencement of his/her work.
- D. Toilet facilities will be provided by the Contractor. The Contractor will be responsible for supplying a portable toilet on the job-site.

1.8 CORRECTION OF WORK PRIOR TO FINAL PAYMENT

- A. The Contractor shall promptly remove any work that does not meet the requirements of the plans and specifications or is incorrectly installed or otherwise disapproved by the Owner as failing to meet the intent of the plans and specifications. The Contractor shall promptly replace any such work without expense to the Owner and shall bear the cost of making good all work of other contractors, or the Owner, destroyed or damaged by such removal or replacement.

1.9 CORRECTION OF WORK AFTER FINAL PAYMENT

- A. The Contractor shall guarantee all materials and workmanship for one (1) year from date of final payment of the contract by the Owner. Any defects which may arise during this period shall be promptly repaired by the Contractor including any damage done to the Owner's property due to such defects.

1.10 DEDUCTION FOR UNCORRECTED WORK

- A. If the Owner deems it unacceptable to have the Contractor correct work which has been incorrectly done, a deduction from the contract price shall be agreed upon therefore. Such a deduction from the contract price shall in no way affect the Contractor's responsibility for defects which may occur nor his/her ability for correcting them, and damage caused by them.

1.11 LIENS

- A. The Contractor shall, if required by the Owner, furnish him/her with a release in full of all liens arising out of this contract or in lieu thereof, and receipts in full for all materials and labor on the job. In either case, the Contractor shall furnish an affidavit that the liens or receipts include all the labor and material for which a lien could be filed. Neither part nor final payment shall in any way release the Contractor from the above obligation and in the event that part or full payment has been made and any lien remains undischarged, the Contractor shall refund to the Owner the necessary funds to discharge such a lien including all cost and attorneys' fees.

1.12 JOB CONDITIONS

- A. No smoking, drugs or alcoholic beverages are permitted on the grounds.
- B. All surfaces to be covered shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Materials shall be stored neatly in areas designated by the Owner and dispersed so as to present a minimum fire hazard.
- C. The Contractor shall place necessary barriers and/or protection around or under all work areas where his/her operations involve risk of injury to plant personnel.
- D. The Contractor will also protect the building structure from damage in the process of the job. In the event that damage does occur to any property or equipment, or the Owner's work in process, notification must be made within two (2) working days of the incidents to the Owner and Owner's Representative.
- E. During the progress of the job, if waste material and rubbish are found or damage resulting from the Contractor's operations is found, or the Contractor does not comply with the requirement by keeping the premises free of accumulations and correct the damage, it shall be the Owner's prerogative to hire personnel to do so; and the cost of this work will be deducted from the balance due the Contractor.
- F. Existing walls, windows, etc. shall be completely protected by masking or other effective methods. Any mastics or asphalt must be cleaned off metal surfaces.
- G. The Contractor is responsible for protecting all materials from the elements. If any material, becomes wet, it cannot be installed and must be replaced at the Contractor's expense.
- H. Anyone guilty of willful destruction or unlawful removal of City property will be dismissed from the job and is subject to prosecution by law.

- I. Any lawns damaged by Contractor vehicles will be restored with a stand of grass at the Contractor's expense. Any damaged pavements will likewise be restored and at the Contractor's expense.
- J. The Contractor must verify that all materials can be installed to accommodate the building design, pertinent codes and regulations, and the manufacturer's current recommendations.
- K. The Contractor will ensure that all substrates are clean, dry, sound, smooth, and free of dirt, debris, and other contamination before any materials are supplied.

1.13 WORKMANSHIP

- A. All materials will be securely fastened and placed in a watertight, neat and workmanlike manner. All workmen shall be thoroughly experienced in the particular class or work upon which they are employed. All work shall be done in accordance with these specifications and shall meet the approval of the Owner. The Contractor's representative or job supervisor shall have a complete copy of specifications and drawings on the job-site at all times.
- B. Contractor shall plan and conduct the operations of the work so that each section started on one day is complete and thoroughly protected before the close of work for that day.

1.14 SAFETY

- A. Contractor shall conform to requirements as designated by the United States Federal Government (O.S.H.A.). Contractor shall abide by all regulations as outlined in the O.S.H.A. handbook and shall have a handbook on location at all times.
- B. Contractors hereby acknowledged that they and their workers have undergone Safety Training and shall at all times act in compliance with all NRCA recommended safety compliance rules and regulations.

1.15 WORK HOURS AND DAYS

- A. When the bid is awarded, the Contractor will contact the Owner to arrange the work schedule and the hours of the day that the workmen may be on the building. The job is to be bid under the assumption that all work will be performed on a straight time basis.

1.16 OWNER'S RULES

- A. The Contractor and all his/her personnel/agent(s) shall abide by all rules created by the Owner. The Contractor must contact the Owner for specific information regarding the rules governing all operations of the project.

1.17 WARRANTIES

- A. A one (1) year workmanship warranty is required from the Contractor for all work done under the terms of this contract.

1.18 PAYMENT

- A. Payment for materials shall only be made after the material has been delivered to the job-site. An invoice for the material must be presented to the Owner for payment. Materials are not to be delivered to the job-site until the project is ready to begin. The Contractor must provide a release of lien from the Material Manufacturer. Subsequent requests for payment can be made monthly.

Final payment for the project will be made following completion, after the final inspection has been made and an invoice presented to the Owner. A 10% retainer shall be held until delivery of the warranty.

- B. When the job in progress is interrupted for two (2) weeks or longer by causes beyond the Contractor's control such as a strike, weather, acts of God, etc., the Owner agrees to pay, upon request of the Contractor, a price equivalent to the percentage of work completed at that time. Regular progress payments shall be made for labor and/or materials.
- C. Each invoice shall be accompanied by a detailed estimate of the amounts and values of labor expended and materials purchased up to the last day of the preceding month. The amount of the invoice shall not exceed ninety percent (90%) of the labor and material values estimated for the preceding month.
- D. Such payments shall be viewed by both parties as progress payments and shall not in any way relieve the Contractor of performance obligations under this contract, nor shall such payments be viewed as approval or acceptance of work performed under this contract.
- E. Final payment shall be withheld until all provisions of the specifications are met, including all necessary cleanup, and the Owner receives written verification of completion.
- F. Upon completion of the job, the Owner and the Contractor will make final inspection of the work done, and the Owner will authorize final payments.
- G. Final payment shall be made to the Contractor no later than thirty (30) days after job approval, providing the Contractor submits waivers of lien with his/her final invoice indicating that all suppliers have been paid.

PART 2 MATERIALS (Not Used)

PART 3 EXECUTION

3.1 JOB COORDINATION

- A. Contractor is responsible for daily communication with the Owner relating to areas of concrete and drainage work in order that the Owner may adequately protect tenant's personal belongings, and the people themselves against possible damage or injury.
- B. At least twenty-four hours prior to starting of the project and/or delivery of materials, the Contractor shall notify: **Dan Hartrey at 603 610-7299.**

3.2 CLEAN-UP

- A. Accumulated debris shall be removed periodically to assure maximum safety and sanitation at all times. At completion of work, the Contractor shall remove all excess material and debris from the site and leave all surfaces free from accumulations of dirt, debris and other extraneous materials. The Contractor shall also remove any and all drippage of materials from the face of the buildings, floor, window, ladders and other finished surfaces.

3.3 HAZARDOUS MATERIALS

- A. Should the Contractor uncover materials that are deemed to be hazardous (i.e., asbestos), all work will cease and the contractor will immediately notify the Owner. The Owner shall have the hazardous material removed before commencing work.

END OF GENERAL CONDITIONS

TECHNICAL SPECIFICATIONS

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION
SECTION 033000 - CAST-IN-PLACE CONCRETE
SECTION 034100 - PRECAST STRUCTURAL CONCRETE
SECTION 034500 - PRECAST ARCHITECTURAL CONCRETE
SECTION 042000 - UNIT MASONRY
SECTION 055200 - METAL RAILINGS
SECTION 079200 - JOINT SEALANTS
SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL
SECTION 312000 - EARTH MOVING
SECTION 321313 - CONCRETE PAVING
SECTION 329200 - TURF AND GRASSES

DRAWINGS

DWG 1 Exterior Concrete Repairs

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 2 - GENERAL

2.1 SECTION REQUIREMENTS

- A. Items indicated to be removed and salvaged remain Owner's property. Remove, clean, and deliver to Owner's designated storage area.
- B. Comply with EPA regulations and hauling and disposal regulations of authorities having jurisdiction.
- C. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- D. It is not expected that hazardous materials will be encountered in the Work. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

PART 3 - PRODUCTS (Not Applicable)

PART 4 - EXECUTION

4.1 DEMOLITION

- A. Maintain services/systems indicated to remain and protect them against damage during selective demolition operations. Before proceeding with demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of the building.
- B. Locate, identify, shut off, disconnect, and cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
- C. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- D. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain or construction being demolished.
- E. Provide temporary weather protection to prevent water leakage and damage to structure and interior areas.
- F. Protect walls, ceilings, floors, and other existing finish work that are to remain. Erect and maintain dustproof partitions. Cover and protect furniture, furnishings, and equipment that have not been removed.
- G. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.
- H. Promptly remove demolished materials from Owner's property and legally dispose of them. Do not burn demolished materials.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 5 - GENERAL

5.1 SECTION REQUIREMENTS

- A. Submittals: All submittals required by ACI 301.
 - 1. Product Data: For each type of product indicated.
 - 2. Design Mixtures: For each concrete mixture.
 - 3. Shop Drawings: For steel reinforcement.
 - 4. Material certificates.
- B. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.
- C. Comply with ACI 301, "Specification for Structural Concrete"; ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"; and CRSI's "Manual of Standard Practice."

5.2 QUALITY ASSURANCE:

- A. Owner's testing agency to provide the following test reports:
 - 1. Field density of base course at areas as follows:
 - a. Retaining walls and foundations: Every 10' on center.
 - b. Walks, curb and gutter: Every 14' on center
 - c. Interior concrete slabs: No less than five dispersed locations.
 - 2. Concrete testing will be performed in accordance with the specifications of ACI 301 as modified as follows:
 - a. ACI 301: 16.3.4.2 Mold and cure three (3) specimens from each sample.
 - b. ACI 301: 16.3.4.4 Compressive strength tests: One set of specimens for each 50 cubic yards or fraction thereof of each concrete class placed in any one day; one specimen tested at seven (7) days, two specimens tested at 28 days.
 - c. ACI 301: 16.3.8 Concrete Temperature: Test hourly when air temperature is below 40 degrees F. and each time a set of specimens is made.
- B. Comply with ACI 305 during hot weather; ACI 306 during cold weather.

PART 6 - PRODUCTS

6.1 MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, **Grade 60**, deformed.
- B. Plain Steel Wire: ASTM A 82, as drawn.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- E. Portland Cement: ASTM C 150, Type I or II.

- F. Fly Ash: ASTM C 618, Type C or F.
- G. Aggregates: ASTM C 33, uniformly graded.
- H. Synthetic Fiber: ASTM C 1116, Type III, polypropylene fibers, **1/2 to 1 inch** long.
- I. Air-Entraining Admixture: ASTM C 260.
- J. Chemical Admixtures: ASTM C 494. Do not use calcium chloride or admixtures containing calcium chloride.
- K. Vapor Retarder: Reinforced polyethylene sheet, ASTM E 1745, Class C.
- L. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
- M. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- N. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- O. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- P. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

6.2 MIXES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
 - 1. Minimum Compressive Strength: **3500 psi** at 28 days.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 - 3. Slump Limit: **4 inches**, plus or minus **1 inch**.
 - 4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.
- C. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116.
 - 1. When air temperature is above **90 deg F**, reduce mixing and delivery time to 60 minutes.

PART 7 - EXECUTION

7.1 CONCRETING

- A. Construct formwork according to ACI 301 and maintain tolerances and surface irregularities within ACI 347R limits of Class A, **1/8 inch** for concrete exposed to view and Class C, **1/2 inch** for other concrete surfaces.
- B. Place vapor retarder on prepared subgrade, with joints lapped **6 inches** and sealed.
- C. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- D. Install construction, isolation, and contraction joints where indicated. Install full-depth joint-filler strips at isolation joints.
- E. Place concrete in a continuous operation and consolidate using mechanical vibrating equipment.

- F. Protect concrete from physical damage, premature drying, and reduced strength due to hot or cold weather during mixing, placing, and curing.
- G. Formed Surface Finish: Smooth-formed finish for concrete exposed to view, coated, or covered by waterproofing or other direct-applied material; rough-formed finish elsewhere.
- H. Slab Finishes: Comply with ACI 302.1R for screeding, reststraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Provide the following finishes:
 - 1. Scratch finish for surfaces to receive mortar setting beds.
 - 2. Float finish for interior steps and ramps and surfaces to receive waterproofing, roofing, or other direct-applied material.
 - 3. Troweled finish for floor surfaces and floors to receive floor coverings, paint, or other thin film-finish coatings.
 - 4. Trowel and fine-broom finish for surfaces to receive thin-set tile.
 - 5. Nonslip-broom finish to exterior concrete platforms, steps, and ramps.
- I. Cure formed surfaces by moist curing for at least seven days.
- J. Begin curing concrete slabs after finishing.
- K. Owner will engage a testing agency to perform field tests and to submit test reports.
- L. Protect concrete from damage. Repair surface defects in formed concrete and slabs.
- M. Thoroughly vibrate exposed formed surfaces to consolidate aggregate. Honeycomb face at exposed formed surfaces will not be accepted.

END OF SECTION 033000

PART 8 - GENERAL**8.1 SECTION REQUIREMENTS**

- A. Structural Performance: Provide precast structural concrete units capable of withstanding design loadings indicated.
- B. Provide units with fire resistance indicated, calculated according to ASTM E 119 and PCI's "Design for Fire Resistance of Precast Prestressed Concrete."
- C. Submittals: Product Data, Shop Drawings, structural and analysis data, signed and sealed by a qualified professional engineer.
- D. Fabricator Qualifications: Fabricator participates in PCI's Plant Certification Program and is designated a PCI-certified plant, Product Group C.
- E. Comply with PCI's "PCI Design Handbook - Precast and Prestressed Concrete," PCI's "Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products," AWS D1.1, and AWS D1.4.

PART 9 - PRODUCTS**9.1 MATERIALS**

- A. Deformed Reinforcing Bars: ASTM A 615/A 615M, **Grade 60**.
- B. Steel Wire: ASTM A 82, plain, cold drawn.
- C. Steel-Welded Wire Fabric: ASTM A 185, plain, cold drawn.
- D. Deformed-Steel-Welded Wire Fabric: ASTM A 497, cold drawn.
- E. Prestressing Strand: ASTM A 416/A 416M, **Grade 250 or 270**, uncoated, 7-wire, low-relaxation strand.
- F. Portland Cement: ASTM C 150, Type I or Type III.
- G. Fly Ash: ASTM C 618, Class C or F.
- H. Silica Fume: ASTM C 1240, amorphous silica.
- I. Normal-Weight Aggregates: ASTM C 33, Class 4S.
- J. Air-Entraining Admixture: ASTM C 260.
- K. Chemical Admixtures: ASTM C 494/C 494M]. Do not use admixtures containing chlorides.

9.2 ACCESSORIES AND FINISHES

- A. Steel Shapes and Plates: ASTM A 36/A 36M.
- B. Bolts and Studs: **ASTM A 307, Grade A** carbon-steel, hex-head bolts and studs; carbon-steel nuts; and flat, unhardened steel washers.
 - 1. Hot-dip galvanize steel items adjacent to or exposed to the exterior according to ASTM A 123/A 123M or ASTM A 153/A 153M.
 - 2. Shop-Primed Finish: Prepare surfaces of steel items according to SSPC-SP 3 and shop apply fast-curing, lead- and chromate-free, rust-inhibitive primer according to SSPC-PA 1.

- C. Bearing Pads: AASHTO M 251, elastomeric, plain, vulcanized; 50 to 70 Shore A durometer hardness.
- D. Grout: ASTM C 150, Type I, portland cement, water, and clean, natural sand.

9.3 CONCRETE MIX

- A. Proportion normal-weight concrete mixes to provide the following properties:
 - 1. Compressive Strength: 4000 psi at 28 days.
 - 2. Water-Cementitious Materials Ratio: 0.40 maximum.
 - 3. Air Content: 5.5 to 7.5 percent for concrete exposed to freezing and thawing, 2.5 to 4.5 percent elsewhere.
- B. Concrete Mixing: Comply with ASTM C 94.
- C. Finishes: Standard for formed surfaces. Trowel unformed surfaces.
- D. Replace precast concrete units deficient in strength, manufacturing tolerances, and finishes.

PART 10 - EXECUTION

10.1 INSTALLATION

- A. Install bearing pads true, level, and on uniform bearing surfaces.
- B. Protect precast units and bearing pads from damage during welding.
- C. Install precast units level, plumb, square, and true, within the recommended erection tolerances of PCI's "Recommended Practice for Erection of Precast Concrete."
- D. Shore and brace precast concrete units to maintain location, stability, and alignment until permanent connections are installed.
- E. Grout open spaces at keyways, connections, and joints after precast concrete units have been placed and secured.
- F. Clean exposed surfaces of precast concrete units after erection.

END OF SECTION 034100

SECTION 034500 - PRECAST ARCHITECTURAL CONCRETE**PART 11 - GENERAL****11.1 SECTION REQUIREMENTS**

- A. Structural Performance: Provide precast architectural concrete units capable of withstanding design loadings indicated.
- B. Submittals: Samples Shop Drawings and structural analysis data signed and sealed by a qualified professional engineer.
- C. Fabricator Qualifications: Fabricator is designated a PCI-certified plant, Group A, Category A1 or is designated an APA-certified plant.
- D. Comply with PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete"; PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products"; AWS D1.1/D.1.1M; and AWS D1.4.

PART 12 - PRODUCTS**12.1 MATERIALS**

- A. Reinforcing Bars: ASTM A 615/A 615M, **Grade 60**, deformed.
- B. Steel-Welded Wire Fabric: ASTM A 185, plain, cold drawn.
- C. Portland Cement: ASTM C 150, Type I or Type III, of one color and from same mill.
- D. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S.
 - 1. Face-Mix Aggregates: Selected, hard, and durable; uniformly graded.
- E. Coloring Admixture: ASTM C 979.
- F. Air-Entraining Admixture: ASTM C 260.
- G. Chemical Admixtures: ASTM C 494/C 494M. Do not use admixtures containing chlorides.

12.2 ACCESSORIES

- A. Steel Shapes and Plates: ASTM A 36/A 36M.
- B. Bolts and Studs: **ASTM A 307, Grade A**; carbon-steel, hex-head bolts and studs; carbon-steel nuts; and flat, unhardened steel washers.
- C. Accessories Finish: Hot-dip galvanize steel items according to ASTM A 123/A 123M or ASTM A 153/A 153M.

12.3 CONCRETE MIX

- A. Proportion normal-weight concrete face and backup mixes to provide the following properties:
 - 1. Compressive Strength: **5000 psi** at 28 days.
 - 2. Water-Cementitious Materials Ratio: 0.45 maximum.

12.4 PRECAST UNITS

- A. Fabricate architectural precast concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.
- B. Panel faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp.
- C. Finish: To be selected by Owner from manufacturer's standard finishes.

PART 13 - EXECUTION

13.1 INSTALLATION

- A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.
- B. Erect architectural precast concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.
- C. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings.
- D. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.
- E. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

END OF SECTION 034500

SECTION 042000 - UNIT MASONRY

PART 14 - GENERAL

14.1 SECTION REQUIREMENTS

- A. Submittals: Material Certificates for each type of product indicated. Include statements of material properties indicating compliance with requirements.
- B. Comply with ACI 530.1/ASCE 6/TMS 602.
- C. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing required by authorities having jurisdiction.

PART 15 - PRODUCTS

15.1 MASONRY UNITS

- A. Concrete Masonry Units: ASTM C 90; Weight Classification, Normal Weight.
 - 1. Integral Water Repellent: Addiment, Incorporated; Block Plus W-10 Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block or Master Builders, Inc.; Rheopel.
 - 2. Special shapes for lintels, corners, jambs, sash, control joints, and other special conditions.
 - 3. Square-edged units for outside corners, unless otherwise indicated.
- B. Concrete Lintels: Precast units matching concrete masonry units and with reinforcing bars indicated or required to support loads indicated.
- C. Building (Common) Brick: ASTM C 62, Grade SW.

15.2 MORTAR AND GROUT

- A. Mortar: [ASTM C 270] [UBC Standard 21-15], proportion specification.
 - 1. Do not use calcium chloride in mortar.
 - 2. For masonry below grade or in contact with earth, use Type M.
 - 3. For reinforced masonry, use Type S.
 - 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. Water-Repellent Additive: For mortar used with concrete masonry units made with integral water repellent, use product recommended by manufacturer of units.
- B. Grout: ASTM C 476 with a slump of 8 to 11 inches.

15.3 REINFORCEMENT, TIES, AND ANCHORS

- A. Steel Reinforcing Bars: ASTM A 615/A 615M, Grade 60.
- B. Joint Reinforcement: ASTM A 951.
 - 1. Coating: Mill galvanized at interior walls and hot-dip galvanized at exterior walls.
 - 2. Wire Diameter for Side Rods: W1.7 or 0.148 inch.

3. Wire Diameter for Cross Rods: W1.7 or **0.148 inch**.
 4. For single-wythe masonry, provide either ladder design or truss design.
 5. For multiwythe masonry, provide ladder design with three side rods.
- C. Veneer Anchors: Hot-dip galvanized steel, two-piece adjustable masonry veneer anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to studs, and acceptable to authorities having jurisdiction.
- 15.4 EMBEDDED FLASHING MATERIALS
- A. Sheet Metal Flashing: Copper, **10-oz./sq. ft.** weight or **0.0135 inch** thick for fully concealed flashing, **16-oz./sq. ft.** weight or **0.0216 inch** thick elsewhere.
 - B. Laminated Flashing: Copper sheet **3 oz./sq. ft.**, bonded with asphalt between 2 layers of glass-fiber cloth.
 - C. Rubberized Asphalt Sheet Flashing: Pliable and highly adhesive rubberized asphalt compound, **26 mils** thick, bonded to a polyethylene film, **4 mils** thick, to produce an overall thickness of **30 mils**.
- 15.5 MISCELLANEOUS MASONRY ACCESSORIES
- A. Compressible Filler: Premolded strips complying with ASTM D 1056, Grade 2A1.
 - B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.
 - C. Weep Holes: Cellular-plastic extrusion, full height and width of head joint.
 - D. Loose-Granular Perlite Insulation: ASTM C 549, Type II or IV.
 - E. Molded-Polystyrene Insulation Units: ASTM C 578, Type I; specially shaped units designed for installing in cores of masonry units.
 - F. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV or X.
 - G. Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 2; aluminum-foil faced.
 - H. Proprietary Acidic Masonry Cleaner: Product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units.

PART 16 - EXECUTION

16.1 INSTALLATION, GENERAL

- A. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.
- B. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- C. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- D. Stopping and Resuming Work: Rack back units; do not tooth.
- E. Fill cores in hollow concrete masonry units with grout **24 inches** under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

- F. Build non-load-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above.
- G. Tool exposed joints slightly concave when thumbprint hard, unless otherwise indicated.
- H. Keep cavities clean of mortar droppings and other materials during construction.
- I. Set firebox brick in full bed of refractory mortar with full head joints. Make joints approximately **1/8 inch** wide and tool smooth.
- J. Set clay flue liners in full beds of refractory mortar to comply with ASTM C 1283.

16.2 LINTELS

- A. Install lintels where indicated.
- B. Minimum bearing of **8 inches** at each jamb, unless otherwise indicated.

16.3 FLASHING AND WEEP HOLES

- A. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
- B. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing before covering with mortar.
 - 1. Extend flashing **4 inches** into masonry at each end and turn up **2 inches** to form a pan.
- C. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.

16.4 PARGING

- A. Parge masonry walls, where indicated, in two uniform coats with a steel-trowel finish. Form a wash at top of parging and a cove at bottom. Damp cure parging for at least 24 hours.

16.5 CLEANING

- A. Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly cured, clean exposed masonry.
 - 1. Wet wall surfaces with water before applying acidic cleaner, then remove cleaner promptly by rinsing thoroughly with clear water.
 - 2. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 042000

SECTION 055200 - METAL RAILINGS

PART 17 - GENERAL

17.1 SECTION REQUIREMENTS

- A. Structural Performance: Provide railings capable of withstanding structural loads required by ASCE 7.
- B. Submittals: Product Data Shop Drawings structural analysis data signed and sealed by a qualified professional engineer registered in the state where Project is located and manufacturer's color charts showing the full range of colors available for factory-applied finishes.

PART 18 - PRODUCTS

18.1 METALS

- A. Aluminum, Extruded Bars and Tubing: **ASTM B 221**, Alloy 6063-T5/T52.
- B. Aluminum Castings: ASTM B 26/B 26M, Alloy A356.0-T6.
- C. Bronze, Extruded Shapes: ASTM B 455, alloy UNS No. C38500 (architectural bronze).
- D. Bronze, Seamless Tubing: **ASTM B 135**, alloy UNS No. C23000 (red brass, 85 percent copper).
- E. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.
- F. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- G. Steel Pipe: ASTM A 53, Schedule 40.
- H. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).
- I. Iron Castings: **ASTM A 47, Grade 32510** or **ASTM A 48, Class 30**.
- J. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

18.2 OTHER MATERIALS

- A. Nonshrink, Nonmetallic Grout: ASTM C 1107; recommended by manufacturer for exterior applications.

18.3 FABRICATION

- A. Assemble railing systems in shop to the greatest extent possible. Use connections that maintain structural value of joined pieces.
- B. Form changes in direction of railing members by bending.
- C. Fabricate railing systems and handrails for connecting members by welding.

- D. Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other construction.
- E. Provide wall returns at ends of wall-mounted handrails.

18.4 FINISHES

- A. Steel Railings: Hot-dip galvanized after fabrication, ASTM A 123; cleaned and shop primed after galvanizing.

PART 19 - EXECUTION

19.1 INSTALLATION

- A. Fit exposed connections accurately together to form tight, hairline joints.
- B. Set railings accurately in location, alignment, and elevation and free of rack.
- C. Coat concealed surfaces of aluminum that will be in contact with cementitious materials or dissimilar metals, with a heavy coat of bituminous paint.
- D. Anchor posts in concrete by forming or core-drilling holes **5 inches** deep and **3/4 inch** greater than OD of post. Fill annular space between post and concrete with nonshrink, nonmetallic grout.
- E. Attach handrails to wall with wall brackets.

END OF SECTION 055200

SECTION 079200 - JOINT SEALANTS

PART 20 - GENERAL

20.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and color Samples.
- B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.

PART 21 - PRODUCTS

21.1 JOINT SEALANTS

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.
- B. Sealant for Use in Building Expansion Joints:
 - 1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, M, and O, with the additional capability to withstand 50 percent movement in both extension and compression for a total of 100 percent movement.
- C. Sealant for General Exterior Use Where Another Type Is Not Specified, One of the Following:
 - 1. Single-component, nonsag polysulfide sealant, ASTM C 920, Type S; Grade NS; Class 12-1/2; Uses NT, M, G, A, and O.
 - 2. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.
 - 3. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; and Uses NT, M, A, and O.
- D. Sealant for Exterior Traffic-Bearing Joints, Where Slope Precludes Use of Pourable Sealant:
 - 1. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.
- E. Sealant for Exterior Traffic-Bearing Joints, Where Slope Allows Use of Pourable Sealant:
 - 1. Single-component, pourable urethane sealant, ASTM C 920, Type S; Grade P; Class 25; Uses T, M, G, A, and O.
- F. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and Around Plumbing Fixtures:
 - 1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses NT, G, A, and O; formulated with fungicide.
- G. Sealant for Interior Use at Perimeters of Door and Window Frames:

1. Latex sealant, single-component, nonsag, mildew-resistant, paintable, acrylic-emulsion sealant complying with ASTM C 834.
- H. Acoustical Sealant for Exposed Interior Joints:
 1. Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834.
- I. Acoustical Sealant for Concealed Joints:
 1. Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.

21.2 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer.
- B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint.

PART 22 - EXECUTION

22.1 INSTALLATION

- A. Comply with ASTM C 1193.
- B. Comply with ASTM C 919 for use of joint sealants in acoustical applications.

END OF SECTION 079200

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL**PART 23 - GENERAL****23.1 SECTION REQUIREMENTS**

- A. Structural Performance: Design, engineer, fabricate, and install hangers and supports to withstand structural loads specified in "Project Conditions" Paragraph below.
- B. Submittals:
 - 1. Product Data: For sleeve seals.
 - 2. Shop Drawings: For hangers and supports including attachments to the structure, identify hardware and indicate analyses, forces, strengths, materials, and dimensions; signed and sealed by a qualified professional engineer. Professional engineer qualification requirements are specified in Division 01 Section "Quality Requirements."

PART 24 - PRODUCTS**24.1 RACEWAYS**

- A. Raceways:
 - 1. EMT: ANSI C80.3, zinc-coated steel, with set-screw or compression fittings.
 - 2. ENT: NEMA TC 13, complying with UL 1653.
 - 3. FMC: Zinc-coated steel.
 - 4. IMC: ANSI C80.6, zinc-coated steel, with threaded fittings.
 - 5. LFMC: Zinc-coated, flexible steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
 - 6. RNC: NEMA TC 2, Type EPC-40-PVC, with NEMA TC3 fittings.
 - 7. Raceway Fittings: Specifically designed for raceway type used in Project.
- B. Wireways: Sheet metal sized and shaped, with hinged covers.
- C. Surface Raceways:
 - 1. Metal: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Owner..
 - 2. Plastic: PVC, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.
- D. Floor Boxes: Cast metal, rectangular.

24.2 CONDUCTORS AND CABLES

- A. Conductors:
 - 1. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.
 - 2. Conductors, Larger Than No. 10 AWG: Stranded copper.

3. Insulation: Thermoplastic, rated at 75 deg C minimum.
 4. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.
- B. Cable Type NM-B and NMC-B Cable: Comply with UL 719 with Type THHN/THWN conductors complying with UL 83.
- C. Cable Type SEU: Comply with UL 854 with Type THHN/THWN conductors complying with UL 83.
- D. Cable Type UF-B: Comply with UL 493 with Type THHN/THWN conductors complying with UL 83.

24.3 GROUNDING MATERIALS

- A. Conductors: Solid for No. 8 AWG and smaller, and stranded for No. 6 AWG and larger unless otherwise indicated.
1. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
 2. Bare, Solid-Copper Conductors: Comply with ASTM B 3.
 3. Bare, Stranded-Copper Conductors: Comply with ASTM B 8.
- B. Ground Rods: Copper-clad steel, sectional type; 5/8 by 96 inches in diameter.
- C. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts with clamp-type pipe connectors sized for pipe.
- D. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

24.4 ELECTRICAL IDENTIFICATION MATERIALS

- A. Raceway Identification Materials: Snap-around, color-coding bands; flexible, preprinted, color-coded acrylic.
- B. Conductor Identification Materials: Color-Coding Conductor Tape: Self-adhesive vinyl tape 1 to 2 inches wide.
- C. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, polyethylene tape with continuous metallic strip or core.
- D. Tape Markers for Wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with circuit identification legend machine printed by thermal transfer or equivalent process.
- E. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- F. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
- G. Equipment Identification Labels: Engraved, laminated acrylic or melamine label; punched or drilled for screw mounting. White letters on a dark-gray background; red letters for emergency systems.

- H. Fasteners: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

24.5 SUPPORT AND ANCHORAGE COMPONENTS

- A. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed under this Project, with a minimum structural safety factor of five times the applied force.
- B. Steel Slotted Support Systems: Comply with MFMA-3, factory-fabricated components for field assembly, and provide finish suitable for the environment in which installed.
 - 1. Channel Dimensions: Selected for structural loading.
- C. Raceway and Cable Supports: As described in NECA 1.
- D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and fittings.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded malleable-iron body and insulating wedging.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted-support-system units similar to MSS Type 18; complying with MFMA-3 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, high strength; complying with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

24.6 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized-steel sheet.
- D. Sleeve Seals: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 2. Pressure Plates: Plastic. Include two for each sealing element.
 - 3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

24.7 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 25 - EXECUTION

25.1 GENERAL ELECTRICAL EQUIPMENT INSTALLATION REQUIREMENTS

- A. Install electrical equipment to allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
- B. Install electrical equipment to provide for ease of disconnecting the equipment with minimum interference to other installations.
- C. Install electrical equipment to allow right of way for piping and conduit installed at required slope.
- D. Install electrical equipment to ensure that connecting raceways, cables, wireways, cable trays, and busways are clear of obstructions and of the working and access space of other equipment.
- E. Install required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- F. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Comply with requirements in Division 08 Section "Access Doors and Frames."
- G. Install sleeve and sleeve seals of type and number required for sealing electrical service penetrations of exterior walls.
- H. Comply with NECA 1.

25.2 RACEWAY AND CABLE INSTALLATION

- A. Outdoor Raceways Applications:
 - 1. Exposed or Concealed: IMC.
 - 2. Underground, Single Run: RNC.
 - 3. Connection to Vibrating Equipment: LFMC.
 - 4. Boxes and Enclosures: Metallic, NEMA 250, Type 3R or Type 4.
- B. Indoor Raceways Applications:
 - 1. Exposed or Concealed: EMT.
 - 2. Connection to Vibrating Equipment: FMC; in wet or damp locations, use LFMC.
 - 3. Damp or Wet Locations: IMC.
 - 4. Boxes and Enclosures: Metallic, NEMA 250, Type 1, unless otherwise indicated.
- C. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
- D. Install raceways and cables at least **6 inches** away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.
- E. Install raceways embedded in slabs in middle third of slab thickness where practical, and leave at least **1-inch**-thick concrete cover.

1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 2. Space raceways laterally to prevent voids in concrete.
 3. Install conduit larger than **1-inch** trade size, parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
 4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.
- F. Raceways Embedded in Slabs:
1. Run conduit larger than **1-inch** trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
- G. Install pull wires in empty raceways.
- H. Connect motors and equipment subject to vibration, noise transmission, or movement with a **72-inch** maximum length of flexible conduit.
- I. Install raceways and cables conceal within finished walls, ceilings, and floors unless otherwise indicated.
- J. Install raceways and cables at least **6 inches** away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.

25.3 WIRING METHODS

- A. Service Entrance: Type THHN-THWN, single conductors in raceway.
- B. Exposed Feeders, Branch Circuits, and Class 1 Control Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- C. Feeders and Branch Circuits Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway.
- D. Feeders and Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and underground: Type THHN-THWN, single conductors in raceway.
- E. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, and strain relief device at terminations to suit application.
- F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

25.4 GROUNDING

- A. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum. Bury at least **24 inches** below grade.
- B. Pipe and Equipment Grounding Conductor Terminations: Bolted.
- C. Underground Connections: Welded.
- D. Connections to Structural Steel: Welded.
- E. Install grounding conductors routed along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

- F. Install ground rods driven into ground until tops are 2 inches below finished floor or final grade unless otherwise indicated.
- G. Make connections without exposing steel or damaging coating, if any.
- H. Install bonding straps and jumpers in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
- I. Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
- J. Bond to equipment mounted on vibration isolation hangers and supports so vibration is not transmitted to rigidly mounted equipment.
- K. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- L. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells.
 - 1. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - 2. Perform tests by fall-of-potential method according to IEEE 81.
 - 3. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

25.5 IDENTIFICATION

- A. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive color coding tape-in bands:
 - 1. Fire Alarm System: Red.
 - 2. Security System: Blue and yellow.
 - 3. Telecommunication System: Green and yellow.
- B. Power-Circuit Conductor Identification: For No. 3 AWG conductors and larger, at each location where observable, identify phase using color-coding conductor tape.
- C. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring.
- D. Warning Labels for Enclosures for Power and Lighting: Comply with 29 CFR 1910.145; identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

- E. Equipment Identification Labels:
1. Labeling Instructions:
 - a. Indoor Equipment: Adhesive film label with clear protective overlay. Provide a single line of text with **1/2-inch-** high letters on **1-1/2-inch-** high label; where 2 lines of text are required, use labels **2 inches** high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label, drilled for screw attachment.
 - c. Elevated Components: Increase sizes of labels and legend to those appropriate for viewing from the floor.
 2. Equipment to Be Labeled:
 - a. Panelboards, electrical cabinets, and enclosures.
 - b. Electrical switchgear and switchboards.
 - c. Transformers.
 - d. Motor-control centers.
 - e. Disconnect switches.
 - f. Enclosed circuit breakers.
 - g. Motor starters.
 - h. Push-button stations.
 - i. Power transfer equipment.
 - j. Contactors.
 - k. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.
- F. Verify identity of each item before installing identification products.
- G. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- H. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- I. Install system identification color banding for raceways and cables at **50-foot** maximum intervals in straight runs, and at **25-foot** maximum intervals in congested areas.
- J. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Ungrounded service conductors.
1. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 2. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of **6 inches** from terminal points.
- K. Underground-Line Warning Tape: Continuous underground-line warning tape directly above line at **6 to 8 inches** below finished grade.

25.6 INSTALLATION OF HANGERS AND SUPPORTS

- A. Fasten hangers and supports securely in place, with provisions for thermal and structural movement. Install with concealed fasteners unless otherwise indicated.
- B. Separate dissimilar metals and metal products from contact with wood or cementitious materials, by painting each metal surface in area of contact with a bituminous coating or by other permanent separation.
- C. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- D. Multiple Raceways or Cables: Install on trapeze-type supports fabricated with steel slotted channel.
- E. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus **200 lb.**
- F. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods, unless otherwise indicated or required by Code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 - 6. To Light Steel: Sheet metal screws.
 - 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount on slotted-channel racks attached to substrate.
- G. Drill holes for expansion anchors in concrete at locations that avoid reinforcing bars.

25.7 SLEEVE AND SLEEVE SEALS INSTALLATION

- A. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- B. Cut sleeves to length for mounting flush with both wall surfaces.
- C. Extend sleeves installed in floors **2 inches** above finished floor level.
- D. Size pipe sleeves to provide **1/4-inch** annular clear space between sleeve and cable unless sleeve seal is to be installed.
- E. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
- F. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."
- G. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

- H. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- I. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

END OF SECTION 260500

SECTION 312000 - EARTH MOVING

PART 26 - GENERAL

26.1 SECTION REQUIREMENTS

- A. Unit prices for rock excavation are included in Division 01 Section "Price and Payment Procedures."
- B. Unauthorized excavation consists of excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- C. Do not interrupt existing utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

PART 27 - PRODUCTS

27.1 MATERIALS

- A. Satisfactory Soil: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than **2 inches** in any dimension, debris, waste, frozen materials, vegetation, or other deleterious matter.
- B. Unsatisfactory Soil: ASTM D 2487 Soil Classification Groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
- C. Backfill and Fill: Satisfactory soil materials.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a **1-1/2-inch** sieve and not more than 12 percent passing a **No. 200** sieve.
- E. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a **1-inch** sieve and not more than 8 percent passing a **No. 200** sieve.
- F. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a **1-1/2-inch** sieve and 0 to 5 percent passing a **No. 8** sieve.

PART 28 - EXECUTION

28.1 EARTHWORK

- A. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing," during earthwork operations.
- B. Protect subgrades and foundation soils from softening and damage by water, freezing temperatures, or frost.
- C. Explosives: Do not use explosives.

- D. Excavate to subgrade elevations regardless of character of materials and obstructions encountered.
- E. Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents.
- F. Excavate for structures, building slabs, pavements, and walkways. Trim subgrades to required lines and grades.
- G. Utility Trenches: Excavate trenches to indicated slopes, lines, depths, and invert elevations. Maintain **12 inches** of working clearance on each side of pipe or conduit.
 - 1. Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.
 - 2. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than **1 inch**, to a height of **12 inches** over the utility pipe or conduit. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface, pulverize, moisture-condition or aerate soil, and recompact.
- I. Place backfill and fill in layers not more than **8 inches** in loose depth at optimum moisture content. Compact each layer under structures, building slabs, pavements, and walkways to 95percent of maximum dry unit weight according to ASTM D 698; elsewhere to 90 percent.
- J. Grade areas to a smooth surface to cross sections, lines, and elevations indicated. Grade lawns, walkways, and unpaved subgrades to tolerances of plus or minus **1 inch** and pavements and areas within building lines to plus or minus **1/2 inch**.
- K. Under pavements and walkways, place subbase course material on prepared subgrades and compact at optimum moisture content to required grades, lines, cross sections, and thicknesses.
- L. Under slabs-on-grade, place drainage course on prepared subgrade and compact to required cross section and thickness.
- M. Allow testing agency to inspect and test each subgrade and each fill or backfill layer and verify compliance with requirements.
- N. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 312000

SECTION 321313 - CONCRETE PAVING

PART 29 - GENERAL

29.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and design mixtures for concrete.
- B. Comply with ACI 301, "Specification for Structural Concrete."

PART 30 - PRODUCTS

30.1 MATERIALS

- A. Welded Wire Reinforcement: ASTM A 185, flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, **Grade 60**, deformed.
- C. Portland Cement: ASTM C 150, Type I or II, gray.
- D. Fly Ash: ASTM C 618, Type C or F.
- E. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate, uniformly graded. Provide aggregates from a single source.
- F. Air-Entraining Admixture: ASTM C 260.
- G. Chemical Admixtures: ASTM C 494. Calcium chloride shall not be used.
- H. Synthetic Fiber: ASTM C 1116, Type III, polypropylene fibers, **1/2 to 1-1/2 inches** long.
- I. Clear, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- J. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

30.2 CONCRETE MIXTURES

- A. Proportion normal-weight concrete mixes to provide the following properties:
 - 1. Compressive Strength: **4000 psi** at 28 days.
 - 2. Slump Limit: **4 inches** plus or minus **1 inch**, at point of placement.
 - 3. W/C Ratio: 0.45 maximum at point of placement.
 - 4. Air Content: 6 percent plus or minus 1 percent.
 - 5. Synthetic Fiber: **1.0 lb/cu. yd.**

PART 31 - EXECUTION

31.1 PAVING

- A. Accurately position and support reinforcement, and secure against displacement.
- B. Locate and install contraction, construction, isolation, and expansion joints as indicated or required.
- C. Place concrete in a continuous operation within planned joints or sections. Do not add water to adjust slump.

- D. Float surfaces to true planes within a tolerance of **1/4 inch in 10 feet** and medium-to-fine-textured broom finish.
- E. Tool edges and joints to a radius of **1/4 inch**.
- F. Begin curing after finishing concrete. Keep concrete continuously moist for at least one day.
- G. Owner will employ a testing agency to sample concrete, perform tests, and submit test reports during concrete placement.
- H. Remove and replace concrete paving that is broken, damaged, or defective. Exclude traffic from paving for at least 14 days.

END OF SECTION 321313

SECTION 329200 - TURF AND GRASSES

PART 32 - GENERAL

32.1 SUMMARY

- A. Restore grassy areas disturbed by construction.

32.2 SECTION REQUIREMENTS

- A. Submittals: product certificates.
- B. Planting Restrictions: Plant during one of the following periods.
 - 1. Spring Planting: After May 1.
 - 2. Fall Planting: Before December 1

PART 33 - PRODUCTS

33.1 GRASSES

- A. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

33.2 SOILS AND AMENDMENTS

- A. Topsoil: ASTM D 5268, free of stones **1 inch** or larger.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer, consisting of **1 lb/1000 sq. ft.** of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
- C. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium; 20 percent nitrogen; 10 percent phosphorous; and 10 percent potassium; by weight.
- D. Straw Mulch: Clean, mildew- and seed-free salt hay or threshed straw of wheat, rye, oats, or barley.
- E. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

PART 34 - EXECUTION

34.1 PREPARATION

- A. Loosen subgrade to a minimum depth of **4 inches**, remove stones, sticks, existing grass, vegetation, and other extraneous materials.

1. At newly graded subgrades, spread planting soil mix to a depth of 4 inches but not less than required to meet finish grades.
 2. At unchanged grades, apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
- B. Grade lawn areas to a smooth, even surface with loose, uniformly fine texture. Moisten before planting.

34.2 PLANTING

- A. Seeding: Evenly distribute seed by sowing with a spreader or a seeding machine. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray. Protect seeded areas by spreading straw mulch 1-1/2 inches in loose depth.
1. Seeding Rate: 2 lb/1000 sq. ft..
- B. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Uniformly blended into a homogeneous slurry.
1. Apply slurry uniformly at a rate so that mulch component is deposited at no less than 1500-lb/acre dry weight, and seed component is deposited at no less than the specified seed-sowing rate.
 2. Seeding Rate: 2 lb/1000 sq. ft..

END OF SECTION 329200

