January 30, 2004
Supersedes October 15, 2003

BEFORE SUBMITTING YOUR BID

1. **Use pen and ink to complete the Bid.**

2. **Have you signed and completed the Contract Agreement, Offer & Award Forms?**

3. **As a minimum, the Bidder will submit a Bid Package consisting of the Notice to Contractors, the completed Acknowledgement of Bid Amendments & Submission of Bid Bond Validation Number form, the completed Schedule of Items, 2 copies of the completed Agreement, Offer, & Award form, a Bid Bond or Bid Guarantee, and any other Certifications or Bid Requirements listed in the Bid Book.**

4. **Have you included prices for all Bid Items? ("Zero is not considered a bid price.")**

5. **Have you included a bid guarantee? Acceptable forms are:**

   A. **Bid Bond on the Department's prescribed form for 5% of the Bid Amount. (Or forms that do not contain any significant variations from the Department's forms as solely determined by the Department.)**

   B. **Official Bank Check, Cashier's Check, Certified Check, U.S. Postal Money Order or Negotiable Certificate of Deposit in the amount stated in the Notice to Contractors.**

6. **If the written Bid is to be sent, Federal Express overnight delivery is suggested as the package is delivered directly to the DOT Headquarters Building in Augusta. Other means, such as U.S. Postal Services' Express Mail has proven not to be reliable.**

AND FOR FEDERAL AID PROJECTS

7. **Have you included your DBE Utilization commitment in the proper amounts and signed the DBE Certification?**

If you need further information regarding Bid preparation, call the DOT Contracts Section at (207)624-3410.

For complete specifications regarding bidding requirements, refer to Section 102 of the Maine Department of Transportation, Standard Specifications, Revision December 2002.

January 30, 2004
Supercedes February 11, 2003

NOTICE

The Maine Department of Transportation is attempting to improve the way Bid Amendments/Addendums are handled, and allow for an electronic downloading of bid packages from our website, while continuing to maintain a planholders list.

Prospective bidders, subcontractors or suppliers who wish to download a copy of the bid package and receive a courtesy notification of project specific bid amendments, must provide an email address to Diane Barnes at the MDOT Contracts mailbox at: MDOT.contracts@maine.gov. Each bid package will require a separate request.

Additionally, interested parties will be responsible for reviewing and retrieving the Bid Amendments from our web site, and acknowledging receipt and incorporating those Bid Amendments in their bids using the Acknowledgement of Bid Amendment Form.

The downloading of bid packages from the MDOT website is not the same as providing an electronic bid to the Department. Electronic bids must be submitted via **http://www.BIDX.com**. For information on electronic bidding contract Rebecca Pooler at **rebecca.pooler@maine.gov**.

NOTICE

For security and other reasons, all Bid Packages which are mailed, shall be provided in double (one envelope inside the other) envelopes. The *Inner Envelope* shall have the following information provided on it:

Bid Enclosed - Do Not Open
PIN:
Town:
Date of Bid Opening:
Name of Contractor with mailing address and telephone number:

In Addition to the usual address information, the *Outer Envelope* should have written or typed on it:

Double Envelope: Bid Enclosed
PIN:
Town:
Date of Bid Opening:
Name of Contractor:
This should not be much of a change for those of you who use Federal Express or similar services.

Hand-carried Bids may be in one envelope as before, and should be marked with the following infrormation:

Bid Enclosed: Do Not Open
PIN:
Town:
Name of Contractor:

STATE OF MAINE DEPARTMENT OF TRANSPORTATION

Bid Guaranty-Bid Bond Form

KNOW ALL MEN BY THESE PRESENTS THAT_____

_____, of the City/Town of _____and State of_____

as Principal, and _____as Surety, a

Corporation duly organized under the laws of the State of_____and having a usual place of

Business in _____and hereby held and firmly bound unto the Treasurer of

the State of Maine in the sum of_____,for payment which Principal and Surety bind

themselves, their heirs, executers, administrators, successors and assigns, jointly and severally.

The condition of this obligation is that the Principal has submitted to the Maine Department of Transportation, hereafter Department, a certain bid, attached hereto and incorporated as a part herein, to enter into a written contract for the construction of _____

_____

_____and if the Department shall accept said bid and the Principal shall execute and deliver a contract in the form attached hereto (properly completed in accordance with said bid) and shall furnish bonds for this faithful performance of said contract, and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be null and void; otherwise it shall remain in full force, and effect.

Signed and sealed this_____day of _____20_____

WITNESS:

_____

_____

_____

WITNESS

_____

_____

_____

PRINCIPAL:

By_____

By:_____

By:_____

SURETY:

By_____

By:_____

Name of Local Agency: _____

SAMPLE

NOTICE

Bidders:

Please use the attached “Request for Information” form when faxing questions and comments concerning specific Contracts that have been Advertised for Bid. Include additional numbered pages as required.

State of Maine
Department of Transportation

REQUEST FOR INFORMATION

Date _____ Time _____

Information Requested: **PIN:** _____ **Town(s):** _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Request by: _____ **Phone: (_____)**_____
Bid Date: _____ **Fax: (_____)**_____

Complete top portion of form and transmit to the number listed in the Notice to Contractors

RFI No: _____ **RFI received:** _____

Response:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Response By:_____ Date: _____

SPECEIFICATIONS

FOR

STATE OF MAINE

DEPARTMENT OF TRANSPORTATION

SAND/SALT STORAGE BUILDING

EDDINGTON

Pin NO, 11988.00

FEBRUARY 13, 2004

William E. Whited, Inc.
Architecture/Engineering/Interiors

1321Washington Ave., Portland, ME 04103
(207) 878-4530 *FAX (207) 878-4533*

STATE OF MAINE DEPARTMENT OF TRANSPORTATION
NOTICE TO CONTRACTORS

Sealed Bids addressed to the Maine Department of Transportation, Augusta, Maine 04333 and endorsed on the wrapper "Bid for building a Salt/ Sand Storage Building in the town/city of Eddington" will be received from contractors at the Reception Desk, Maine DOT Building, Child Street, Augusta, Maine, until 11:00 o'clock A.M. (prevailing time) on May 19,2004 , and at that time and place publicly opened and read. **MDOT provides the option of electronic bidding. We accept electronic bids for those bid packages posted on the bidx.com website. Electronic bids do not have to be accompanied by paper bids. Please note: the Department will accept a facsimile of the bid bond; however, the original bid bond must then be received at the MDOT Contract Section within 72 hours of the bid opening. During this transition, dual bids (one paper, one electronic) will be accepted, with the paper copy taking precedence.**

Description: PIN 11988.00

Location: In Penobscot County, project is located the town of Eddington

Outline of Work: This is a wooden Quonset type structure approximately 50'x72' with laminated wooden arches with metal siding on concrete frost walls and interior paving and other incidental work.

For general information regarding Bidding and Contracting procedures, contact Scott Bickford at (207)624-3410. Our webpage at http://www.state.me.us/mdot/project/design/homepg.htm contains a copy of the schedule of items, Plan Holders List, written portions of bid amendments (not drawings), and bid results. For Project-specific information fax all questions to John Cannell at (207) 623-2526. Questions received after 12:00 noon of Monday prior to bid date will not be answered. Bidders shall not contact any other Departmental staff for clarification of Contract provisions, and the Department will not be responsible for any interpretations so obtained. Hearing impaired persons may call the Telecommunication Device for the Deaf at (207) 287-3392
Plans, specifications and bid forms may be seen at the Maine Department of Transportation, 16 State House Station in Augusta, Maine and at the Department of Transportation's Division Office in Bangor. They may be purchased from the Department between the hours of 8:00 a.m. to 4:30 p.m. by cash, credit card (Visa/Mastercard) or check payable to Treasurer, State of Maine sent to Maine Department of Transportation, Attn.: Mailroom, 16 State House Station, Augusta, Maine 04333-0016. They also may be purchased by telephone at (207)624-3536 between the hours of 8:00 a.m. to 4:30 p.m. Full size plans $4.00 ($7.50 by mail). Half size plans $2.00 ($5.50 by mail), Bid Book $10 ($13 by mail), Single Sheets $2.00 payment in advance, all non-refundable.

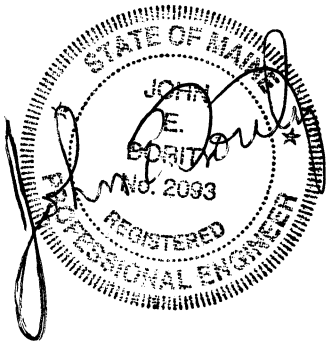
Each Bid must be made upon blank forms provided by the Department and must be accompanied by a bid bond at 5% of the bid amount or an official bank check, cashier's check, certified check, certificate of deposit, or United States postal money order in the amount of $5000 payable to Treasurer, State of Maine as a Bid guarantee. A Contract Performance Surety Bond and a Contract Payment Surety Bond, each in the amount of 100 percent of the Contract price, will be required of the successful Bidder.

This Contract is subject to all applicable Federal Laws.

All work shall be governed by "State of Maine, Department of Transportation, Standard Specifications, Revision of December 2002", price $10 [$13 by mail], and Standard Details, Revision of December 2002, price $20 [$25 by mail]. Standard Detail updates can be found at http://www.state.me.us/mdot/project/design/homepg.htm

The right is hereby reserved by the MDOT to reject any or all bids.

Augusta, Maine
May 5, 2004



JOHN E. DORITY
CHIEF ENGINEER

STATE OF MAINE DEPARTMENT OF TRANSPORTATION
NOTICE TO CONTRACTORS

Sealed Bids addressed to the Maine Department of Transportation, Augusta, Maine 04333 and endorsed on the wrapper "Bid for building a Salt/ Sand Storage Building in the town/city of Eddington" will be received from contractors at the Reception Desk, Maine DOT Building, Child Street, Augusta, Maine, until 11:00 o'clock A.M. (prevailing time) on May 19,2004 , and at that time and place publicly opened and read. **MDOT provides the option of electronic bidding. We accept electronic bids for those bid packages posted on the bidx.com website. Electronic bids do not have to be accompanied by paper bids. Please note: the Department will accept a facsimile of the bid bond; however, the original bid bond must then be received at the MDOT Contract Section within 72 hours of the bid opening. During this transition, dual bids (one paper, one electronic) will be accepted, with the paper copy taking precedence.**

Description: PIN 11988.00

Location: In Penobscot County, project is located the town of Eddington

Outline of Work: This is a wooden Quonset type structure approximately 50'x72' with laminated wooden arches with metal siding on concrete frost walls and interior paving and other incidental work.

For general information regarding Bidding and Contracting procedures, contact Scott Bickford at (207)624-3410. Our webpage at http://www.state.me.us/mdot/project/design/homepg.htm contains a copy of the schedule of items, Plan Holders List, written portions of bid amendments (not drawings), and bid results. For Project-specific information fax all questions to John Cannell at (207) 623-2526. Questions received after 12:00 noon of Monday prior to bid date will not be answered. Bidders shall not contact any other Departmental staff for clarification of Contract provisions, and the Department will not be responsible for any interpretations so obtained. Hearing impaired persons may call the Telecommunication Device for the Deaf at (207) 287-3392
Plans, specifications and bid forms may be seen at the Maine Department of Transportation, 16 State House Station in Augusta, Maine and at the Department of Transportation's Division Office in Bangor. They may be purchased from the Department between the hours of 8:00 a.m. to 4:30 p.m. by cash, credit card (Visa/Mastercard) or check payable to Treasurer, State of Maine sent to Maine Department of Transportation, Attn.: Mailroom, 16 State House Station, Augusta, Maine 04333-0016. They also may be purchased by telephone at (207)624-3536 between the hours of 8:00 a.m. to 4:30 p.m. Full size plans $4.00 ($7.50 by mail). Half size plans $2.00 ($5.50 by mail), Bid Book $10 ($13 by mail), Single Sheets $2.00 payment in advance, all non-refundable.

Each Bid must be made upon blank forms provided by the Department and must be accompanied by a bid bond at 5% of the bid amount or an official bank check, cashier's check, certified check, certificate of deposit, or United States postal money order in the amount of $5000 payable to Treasurer, State of Maine as a Bid guarantee. A Contract Performance Surety Bond and a Contract Payment Surety Bond, each in the amount of 100 percent of the Contract price, will be required of the successful Bidder.

This Contract is subject to all applicable Federal Laws.

All work shall be governed by "State of Maine, Department of Transportation, Standard Specifications, Revision of December 2002", price $10 [$13 by mail], and Standard Details, Revision of December 2002, price $20 [$25 by mail]. Standard Detail updates can be found at http://www.state.me.us/mdot/project/design/homepg.htm

The right is hereby reserved by the MDOT to reject any or all bids.

Augusta, Maine
May 5, 2004

JOHN E. DORITY
CHIEF ENGINEER

TOWNS: Eddington
PINS: 11988.00
May 5, 2004
Supercedes October 29, 2003

SPECIAL PROVISION 102.7.3
ACKNOWLEDGMENT OF BID AMENDMENTS
&
SUBMISSION OF BID BOND VALIDATION NUMBER (IF APPLICABLE)

With this form, the Bidder acknowledges its responsibility to check for all Amendments to the Bid Package. For each Project under Advertisement, Amendments are located at http://www.maine.gov/mdot/comprehensive-list-projects/project-information.php It is the responsibility of the Bidder to determine if there are Amendments to the Project, to download them, to incorporate them into their Bid Package, and to reference the Amendment number and the date on the form below. The Maine DOT will not post Bid Amendments any later than noon the day before Bid opening without individually notifying all the planholders.

Amendment Number	Date

The Contractor, for itself, its successors and assigns, hereby acknowledges that it has received all of the above referenced Amendments to the Bid Package.

CONTRACTOR

_____
Date

_____
Signature of authorized representative

_____
(Name and Title Printed)

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street, Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and _____

_____

a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at _____

_____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, **Pin No. 11988.00**, for the Construction of a **Salt/Sand Storage Building** in the town of **Eddington**. County of **Penobscot**, **Maine**. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time

The Contractor agrees to complete all Work, except warranty work, on or before 11/30/2004 further. The Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of Standard Specifications, Revision of December 2002.

C. Price

The LUMP SUM Bid Price will be used as the basis for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is _____

_____

$_____ Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details, Revision of 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to the Division 100 General Conditions (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications, Revision of December 2002,Standard Details, Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of: **A Salt/Sand Storage Building Pin No. 11988.00 in** the Town of **Eddington , Maine**, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract".

The Offeror agrees to perform the work required at the price specified above and in" strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents, including Section 109.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work on the date specified in the Engineer's "Notice to Commence Work" as stated in Section 107.2 of the Standard Specifications, Revision of December 2002, and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Fifth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	_____
Date	(Signature of Legally Authorized Representative of the Contractor)
_____	_____
Witness	(Name and Title Printed)

G. Award

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: David A. Cole, Commissioner
_____	
Witness	

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street, Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and _____

_____

a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at _____

_____

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

A. The Work

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, **Pin No. 11988.00**, for the Construction of a **Salt/Sand Storage Building** in the town of **Eddington**. County of **Penobscot**, **Maine**. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time

The Contractor agrees to complete all Work, except warranty work, on or before 11/30/2004 further. The Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of Standard Specifications, Revision of December 2002.

C. Price

The LUMP SUM Bid Price will be used as the basis for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is _____

_____

$_____ Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details, Revision of 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to the Division 100 General Conditions (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications, Revision of December 2002,Standard Details, Revision of December 2002 as updated through advertisement, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of: **A Salt/Sand Storage Building Pin No. 11988.00 in** the Town of **Eddington , Maine**, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract".

The Offeror agrees to perform the work required at the price specified above and in" strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents, including Section 109.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work on the date specified in the Engineer's "Notice to Commence Work" as stated in Section 107.2 of the Standard Specifications, Revision of December 2002, and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

Fifth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	_____
Date	(Signature of Legally Authorized Representative of the Contractor)
_____	_____
Witness	(Name and Title Printed)

G. Award

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: David A. Cole, Commissioner
_____	
Witness	

CONTRACT AGREEMENT, OFFER & AWARD

AGREEMENT made on the date last signed below, by and between the State of Maine, acting through and by its Department of Transportation (Department), an agency of state government with its principal administrative offices located at Child Street Augusta, Maine, with a mailing address at 16 State House Station, Augusta, Maine 04333-0016, and **(Name of the firm bidding the job)** a corporation or other legal entity organized under the laws of the State of Maine, with its principal place of business located at **(address of the firm bidding the job)**

The Department and the Contractor, in consideration of the mutual promises set forth in this Agreement (the "Contract"), hereby agree as follows:

SAMPLE

A. The Work.

The Contractor agrees to complete all Work as specified or indicated in the Contract including Extra Work in conformity with the Contract, PIN No. **1224.00**, for the **Hot Mix Asphalt Overlay** in the town/city of **West Eastport**, County of **Washington**, Maine. The Work includes construction, maintenance during construction, warranty as provided in the Contract, and other incidental work.

The Contractor shall be responsible for furnishing all supervision, labor, equipment, tools supplies, permanent materials and temporary materials required to perform the Work including construction quality control including inspection, testing and documentation, all required documentation at the conclusion of the project, warranting its work and performing all other work indicated in the Contract.

The Department shall have the right to alter the nature and extent of the Work as provided in the Contract; payment to be made as provided in the same.

B. Time.

The Contractor agrees to complete all Work, except warranty work, on or before **November 15**, 2003. Further, the Department may deduct from moneys otherwise due the Contractor, not as a penalty, but as Liquidated Damages in accordance with Sections 107.7 and 107.8 of the State of Maine Department of Transportation Standard Specifications, Revision of December 2002.

C. Price.

The quantities given in the Schedule of Items of the Bid Package will be used as the basis for determining the original Contract amount and for determining the amounts of the required Performance Surety Bond and Payment Surety Bond, and that the amount of this offer is **(Place bid here in alphabetical form such as One Hundred and Two dollars and 10 cents)** **$ (repeat bid here in numerical terms, such as $102.10)** Performance Bond and Payment Bond each being 100% of the amount of this Contract.

D. Contract.

This Contract, which may be amended, modified, or supplemented in writing only, consists of the Contract documents as defined in the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds. It is agreed and understood that this Contract will be governed by the documents listed above.

E. Certifications.

By signing below, the Contractor hereby certifies that to the best of the Contractor's knowledge and belief:

1. All of the statements, representations, covenants, and/or certifications required or set forth in the Bid and the Bid Documents, including those in Appendix A to Division 100 of the Standard Specifications Revision of December 2002 (Federal Contract Provisions Supplement), and the Contract are still complete and accurate as of the date of this Agreement.

2. The Contractor knows of no legal, contractual, or financial impediment to entering into this Contract.

3. The person signing below is legally authorized by the Contractor to sign this Contract on behalf of the Contractor and to legally bind the Contractor to the terms of the Contract.

F. Offer.

SAMPLE

The undersigned, having carefully examined the site of work, the Plans, Standard Specifications, Revision of December 2002, Standard Details Revision of December 2002, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

PIN 1234.00 West Eastport, Hot Mix Asphalt Overlay,

State of Maine, on which bids will be received until the time specified in the "Notice to Contractors" do(es) hereby bid and offer to enter into this contract to supply all the materials, tools, equipment and labor to construct the whole of the Work in strict accordance with the terms and conditions of this Contract at the unit prices in the attached "Schedule of Items".

The Offeror agrees to perform the work required at the price specified above and in accordance with the bids provided in the attached "Schedule of Items" in strict accordance with the terms of this solicitation, and to provide the appropriate insurance and bonds if this offer is accepted by the Government in writing.

As Offeror also agrees:

First: To do any extra work, not covered by the attached "Schedule of Items", which may be ordered by the Resident, and to accept as full compensation the amount determined upon a "Force Account" basis as provided in the Standard Specifications, Revision of December 2002, and as addressed in the contract documents.

Second: That the bid bond at 5% of the bid amount or the official bank check, cashier's check, certificate of deposit or U. S. Postal Money Order in the amount given in the "Notice to Contractors", payable to the Treasurer of the State of Maine and accompanying this bid, shall be forfeited, as liquidated damages, if in case this bid is accepted, and the undersigned shall fail to abide by the terms and conditions of the offer and fail to furnish satisfactory insurance and Contract bonds under the conditions stipulated in the Specifications within 15 days of notice of intent to award the contract.

Third: To begin the Work on the date specified in the Engineer's "Notice to Commence Work" as stated in Section 107.2 of the Standard Specifications Revision of 2002 and complete the Work within the time limits given in the Special Provisions of this Contract.

Fourth: The Contractor will be bound to the Disadvantaged Business Enterprise (DBE) Requirements contained in the attached Notice (Additional Instructions to Bidders) and submit a completed Contractor's Disadvantaged Business Enterprise Utilization Plan by 4:30pm on the day of bid opening to the Contracts Engineer.

Fifth: That this offer shall remain open for 30 calendar days after the date of opening of bids.

SAMPLE

Sixth: The Bidder hereby certifies, to the best of its knowledge and belief that: the Bidder has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of competitive bidding in connection with its bid, and its subsequent contract with the Department.

IN WITNESS WHEREOF, the Contractor, for itself, its successors and assigns, hereby execute two duplicate originals of this Agreement and thereby binds itself to all covenants, terms, and obligations contained in the Contract Documents.

CONTRACTOR

_____	**(Sign Here)**
Date	(Signature of Legally Authorized Representative of the Contractor)
____**(Witness Sign Here)**_____	**(Print Name Here)**
Witness	(Name and Title Printed)

SAMPLE

G. Award.

Your offer is hereby accepted. This award consummates the Contract, and the documents referenced herein.

MAINE DEPARTMENT OF TRANSPORTATION

_____	_____
Date	By: David A. Cole, Commissioner

_____

(Witness)

State of Maine
Department of Labor
Bureau of Labor Standards
Technical Services Division
Augusta, Maine 04333-0045
Telephone (207) 624-6445

Wage Determination - In accordance with 26 MRSA §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid laborers and workers employed on the below titled project.

Title of Project -------- Sand & Salt Shed MDOT Pin # 11988.00

Location of Project -- Eddington, Maine in Penobscot County

2004 Fair Minimum Wage Rates
Building 2 Penobscot County
(other than 1 or 2 family homes)

Occupation Title	Minimum Wage	Minimum Benefit	Total	Occupation Title	Minimum Wage	Minimum Benefit	Total
Asbestos Abatement Wrkr	$14.17	$0.52	$14.69	Ironworker - Reinforcing	$14.00	$1.35	$15.35
Assembler - Metal Bldg	$12.00	$0.00	$12.00	Ironworker - Structural	$18.00	$5.74	$23.74
Bricklayer	$20.50	$2.40	$22.90	Laborers/Helper/Tender	$10.50	$0.58	$11.08
Bulldozer Operator	$11.13	$1.43	$12.56	Laborer - Skilled	$12.20	$1.24	$13.44
Carpenter	$15.00	$1.75	$16.75	Machine Assembler	$18.00	$5.74	$23.74
Carpenter - Acoustical	$12.00	$1.67	$13.67	Mechanic - Maintenance	$16.69	$2.43	$19.12
Carpenter - Rough	$12.00	$0.82	$12.82	Mechanic - Refrigeration	$17.50	$4.19	$21.69
Cement Mason/Finisher	$14.00	$1.46	$15.46	Millwright	$18.00	$1.67	$19.67
Commun Equip Installer	$18.31	$10.84	$29.15	Oil/Fuel Burner Serv & Instr	$15.00	$3.18	$18.18
Concrete Pump Operator	$17.00	$1.61	$18.61	Painter	$11.00	$0.21	$11.21
Crane Operator <15 Tons	$16.25	$2.83	$19.08	Paperhanger	$13.00	$0.00	$13.00
Dry-Wall Applicator	$18.00	$0.00	$18.00	Pipe/Stm/Sprkler Fitter	$18.00	$4.15	$22.15
Dry-Wall Taper & Finisher	$17.00	$1.29	$18.29	Plumber (Licensed)	$15.45	$2.69	$18.14
Electrician	$18.75	$5.27	$24.02	Plumber Trainee	$12.00	$2.69	$14.69
Electrician Hlpr (Licensed)	$12.50	$2.71	$15.21	Roofer	$12.25	$1.48	$13.73
Elevator Constrctr/Installer	$27.45	$10.06	$37.51	Sheet Metal Worker	$14.25	$2.38	$16.63
Excavator Operator	$15.62	$3.27	$18.89	Sider	$12.25	$0.00	$12.25
Floor Layer	$12.00	$1.26	$13.26	Swimming Pool Installer	$18.45	$4.92	$23.37
Glazier	$13.00	$2.02	$15.02	Tile Setter	$18.64	$5.89	$24.53
Industrial Truck (Frklft) Op	$18.00	$5.74	$23.74	Truck Driver - Heavy	$11.84	$2.46	$14.30
Insulation Installer	$12.00	$1.28	$13.28				

The Laborer classifications include a wide range of work duties. Therefore, if any specific occupation to be employed on this project is not listed in this determination, call the Bureau of Labor Standards at the above number for further clarification.

Welders are classified in the trade to which the welding is incidental.

Apprentices - The minimum wage rate for registered apprentices are those set forth in the standards and policies of the Maine State Apprenticeship and Training Council for approved apprenticeship programs.

Posting of Schedule - Posting of this schedule is required in accordance with 26 MRSA §1301 et. seq., by any contractor holding a State contract for construction valued at $50,000 or more and any subcontractors to such a contractor.

Appeal - Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates with the Secretary of State.

Determination No: B2-031-2004

Filing Date: March 5, 2004

Expiration Date: 12-31-2004

A true copy

Attest: _____
William A. Peabody
Director
Bureau of Labor Standards

BLS 424BU (R2004) (Building 2 Penobscot)

Town:Eddington
PIN:11988.00
Date: 11/30/2004

SPECIAL PROVISION
SECTION 107
Prosecution and progress
Contract TIME

107.4.2 Schedule of Work Required. This Section is amended by the following:

In addition to the Contractors initial CPM Schedule, the Department will require the Contractor to update the schedule monthly to show current progress. The submittal date for monthly updates shall be determined by the Resident.

The specified contract completion date is November 30, 2004

SPECIAL PROVISION SECTION 656
TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL
State Supplied SEWPCP

Section 656 of the Standard Specifications is deleted and replaced by this Special Provision.

656.1 The following information and requirements shall constitute the Soil Erosion and Water Pollution Control Plan for this Project. The soil erosion and water pollution control measures associated with this work are as follows:

a) All work shall be done in accordance with the latest revision of the Maine Department of Transportation Best Management Practices for Erosion and Sediment Control (a.k.a. Best Management Practices manual or BMP Manual). The "Table of Contents" of the latest version is dated "1/19/00" (available at http://www.state.me.us/mdot/mainhtml/bmp/bmpjan2000.pdf.)

b) The on-site person responsible for implementation of this plan shall be the Contractor's Superintendent or other supervisory employee (the "Environmental Coordinator") with the authority to immediately remedy any deficient controls. The Environmental Coordinator shall provide the Resident with the numbers (telephone number, cellular phone and pager numbers, if applicable) where the Environmental Coordinator can be reached 24 hours a day.

c) All earth materials shall be disposed of in accordance with all federal, state, and local laws and regulations. If the materials will be stockpiled on-site they shall be contained on-site to prevent sediments from entering any drainage system or from washing into a protected water body or resource.

d) If the earth materials will be reused on-site, they shall be mulched at the end of each working day, and seeded in accordance with Section 618, unless the contract states otherwise. The materials shall be contained, as necessary, to prevent sediments from entering any drainage system or from washing into a protected water body or resource.

e) All areas where soil is disturbed shall be permanently mulched on a daily basis and seeded on a weekly basis (if seeded by hand, it shall be done on a daily basis). All previously mulched areas shall be maintained and re-mulched on a daily basis if bare areas develop until an acceptable growth of grass has been obtained.

f) Winter stabilization BMPs such as double mulching or Erosion Control Mix shall be applied in accordance with the MDOT BMP Manual between November 1 and April 15 or during frozen ground conditions.

g) The Environmental Coordinator must inspect and maintain daily, all erosion and sediment controls for the duration of the project.

h) Any costs related to this plan shall be considered incidental to the contract.

656. 2 If the work includes the handling or storage of petroleum products or hazardous materials including the on-site fueling of equipment, the Contractor shall prepare and submit to the Resident Engineer for approval a Spill Prevention Control and Countermeasure Plan (SPCCP) plan. At a minimum, the SPCCP shall include:

- The name and emergency response numbers (telephone number, cellular phone and pager numbers, if applicable) of the Contractor's representative responsible for spill prevention;

- General description and location of (1) handling, transfer, storage, and containment facilities of such products or Materials ("activities and facilities") and (2) potential receptors of such products or Materials including oceans, lakes, ponds, rivers, streams, wetlands, and sand and gravel aquifers ("sensitive resources") including the distances between said activities and facilities and said sensitive resources;

- Description of preventative measures to be used to minimize the possibility of a spill including Equipment and/or Materials to be used to prevent discharges including absorbent Materials,

- A contingency response plan to be implemented if spill should occur including a list of emergency phone/pager numbers including the Contractor's representative, MDEP Spill Response, the Resident, and local police and fire authorities. For a related provision, see 105.2.2 - "Project Specific Emergency Planning".

DOCUMENT 00601
FORM OF GENERAL CONTRACT PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____, as Principal and _____ a corporation duly organized under the laws of the State of _____ and having a usual place of business _____ as Surety, are held and firmly bound unto the Treasurer of the State of Maine in the sum of _____ ($_____), to be paid said Treasurer of the State of Maine or his successors in office, for which payment well and truly to be made, Principal and Surety bind themselves, their heirs, executors and administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in the foregoing contract shall promptly and faithfully perform the contract, then this obligation shall be null and void: otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the State of Maine. Signed and sealed this _____ day of _____, 20_____.

WITNESSES:	SIGNATURES:
Signature:	CONTRACTOR:
_____	_____
_____	_____
print name legibly	print name legibly
Signature:	SURETY:
_____	_____
_____	_____
print name legibly	print name legibly
SURETY ADDRESS:	NAME, ADDRESS OF LOCAL AGENCY:
_____	_____
_____	_____
TELEPHONE: _____	TELEPHONE: _____

*** END OF SECTION ***

DOCUMENT 00413
FORM OF GENERAL CONTRACT BID BOND

KNOW ALL MEN BY THESE PRESENTS THAT _____

_____, of the _____of

_____ and State of _____ as Principal,

and _____ as

Surety, a corporation duly organized under the laws of the State of _____ and

having a usual place of business in _____
and hereby held and firmly bound unto the Treasurer of the State of Maine in the sum of

_____ for payment which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

The condition of this obligation is such that if the Principal has submitted to the Maine Department of Transportation, hereafter called Department, a certain proposal, attached hereto and incorporated as a part herein, to enter into a written contract for the construction of A Salt/Sand Shed , Maine Department of Transportation, Eddington, Maine and if the Department shall accept said proposal and the Principal shall execute and deliver a contract in the form attached hereto (properly completed in accordance with said proposal) and shall furnish bonds for his faithful performance of said contract and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said proposal, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Signed and sealed this _____day of _____, 20_____.

WITNESS:	PRINCIPAL:
_____	By:_____
_____	By:_____
_____	By:_____
WITNESS:	SURETY:
_____	By:_____
_____	By:_____
	name of local agency:
	_____

*** END OF SECTION ***

DOCUMENT 00602
FORM OF GENERAL CONTRACT PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____, as Principal and _____ a corporation duly organized under the laws of the State of _____ and having a usual place of business _____ as Surety, are held and firmly bound unto the Treasurer of the State of Maine for the use and benefit of claimants as herein below defined in the sum of _____ ($_____), for the payment whereof Principal and Surety, bind themselves, their heirs, executors and administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Principal designated as Contractor in the foregoing contract shall promptly satisfy all claims and demands incurred for all labor and material, used or required by him in connection with the work contemplated by said contract, and shall full reimburse the obligee for all outlay and expense which the obligee may incur in making good any default of said Principal, then this obligation shall be null and void: otherwise it shall remain in full force and effect.

A claimant is defined as one having a direct contract with the Principal or with a subcontractor of the Principal for labor, material or both, used or reasonably required for use in the performance of the contract.

Signed and sealed this _____ day of _____, 20_____.

WITNESSES:	SIGNATURES:
Signature:	CONTRACTOR:
_____	_____
_____	_____
print name legibly	print name legibly
Signature:	SURETY:
_____	_____
_____	_____
print name legibly	print name legibly
SURETY ADDRESS:	NAME, ADDRESS OF LOCAL AGENCY:
_____	_____
_____	_____
TELEPHONE: _____	TELEPHONE: _____

*** END OF SECTION ***

April 26, 2004
Supersedes March 24, 2004

SPECIAL PROVISION
(Consolidated Special Provisions)

SPECIAL PROVISION SECTION 101
CONTRACT INTERPRETATION

101.2 Definitions - Closeout Documentation

Replace the sentence "A letter stating the amount..... DBE goals." with "DBE Goal Attainment Verification Form"

SPECIAL PROVISION SECTION 102
DELIVERY OF BIDS
(Location and Time)

102.7.1 Location and Time Add the following sentence "As a minimum, the Bidder will submit a Bid Package consisting of the Notice to Contractors, the completed Acknowledgement of Bid Amendments & Submission of Bid Bond Validation Number form, the completed Schedule of Items, 2 copies of the completed Agreement, Offer, & Award form, a Bid Bond or Bid Guarantee, and any other Certifications or Bid Requirements listed in the Bid Book."

SPECIAL PROVISION SECTION 103
AWARD AND CONTRACTING

103.3.1 Notice and Information Gathering

Change the first paragraph to read as follows: "After Bid Opening and as a condition for Award of a Contract, the Department may require an Apparent Successful Bidder to demonstrate to the Department's satisfaction that the Bidder is responsible and qualified to perform the Work."

SPECIAL PROVISION SECTION 105
GENERAL SCOPE OF WORK

Delete the entire Section 105.6 and replace with the following:

105.6.1 Department Provided Services The Department will provide the Contractor with the description and coordinates of vertical and horizontal control points, set by the Department, within the Project Limits, for full construction Projects and other Projects where survey control

is necessary. For Projects of 1,500 feet in length, or less: The Department will provide three points. For Projects between 1,500 and 5,000 feet in length: The Department will provide one set of two points at each end of the Project. For Projects in excess of 5,000 feet in length, the Department will provide one set of two points at each end of the Project, plus one additional set of two points for each mile of Project length. For non-full construction Projects and other Projects where survey control is not necessary, the Department will not set any control points and, therefore, will not provide description and coordinates of any control points. Upon request of the Contractor, the Department will provide the Department's survey data management software and Survey Manual to the Contractor, or its survey Subcontractor, for the exclusive use on the Department's Projects.

105.6.2 Contractor Provided Services Utilizing the survey information and points provided by the Department, described in Subsection 105.6.1, Department Provided Services, the Contractor shall provide all additional survey layout necessary to complete the Work. This may include, but not be limited to, reestablishing all points provided by the Department, establishing additional control points, running axis lines, providing layout and maintenance of all other lines, grades, or points, and survey quality control to ensure conformance with the Contract. The Contractor is also responsible for providing construction centerline, or close reference points, for all Utility Facilities relocations and adjustments as necessary to complete the Work. When the Work is to connect with existing Structures, the Contractor shall verify all dimensions before proceeding with the Work. The Contractor shall employ or retain competent engineering and/or surveying personnel to fulfill these responsibilities.

The Contractor must notify the Department of any errors or inconsistencies regarding the data and layout provided by the Department as provided by Section 104.3.3 - Duty to Notify Department If Ambiguities Discovered.

105.6.2.1 Survey Quality Control The Contractor is responsible for all construction survey quality control. Construction survey quality control is generally defined as, first, performing initial field survey layout of the Work and, second, performing an independent check of the initial layout using independent survey data to assure the accuracy of the initial layout; additional iterations of checks may be required if significant discrepancies are discovered in this process. Construction survey layout quality control also requires written documentation of the layout process such that the process can be followed and repeated, if necessary, by an independent survey crew.

105.6.3 Survey Quality Assurance It is the Department's prerogative to perform construction survey quality assurance. Construction survey quality assurance may, or may not, be performed by the Department. Construction survey quality assurance is generally defined as an independent check of the construction survey quality control. The construction survey quality assurance process may involve physically checking the Contractor's construction survey layout using independent survey data, or may simply involve reviewing the construction survey quality

control written documentation. If the Department elects to physically check the Contractor's survey layout, the Contractor's designated surveyor may be required to be present. The Department will provide a minimum notice of 48 hours to the Contractor, whenever possible, if the Contractor's designated surveyor's presence is required. Any errors discovered through the quality assurance process shall be corrected by the Contractor, at no additional cost to the Department.

105.6.4 Boundary Markers The Contractor shall preserve and protect from damage all monuments or other points that mark the boundaries of the Right-of-Way or abutting parcels that are outside the area that must be disturbed to perform the Work. The Contractor indemnifies and holds harmless the Department from all claims to reestablish the former location of all such monuments or points including claims arising from 14 MRSA § 7554-A. For a related provision, see Section 104.3.11 - Responsibility for Property of Others.

SPECIAL PROVISION SECTION 106
QUALITY

106.6 Acceptance Add the following to paragraph 1 of A: "This includes Sections 401 - Hot Mix Asphalt, 402 - Pavement Smoothness, and 502 - Structural Concrete - Method A - Air Content."

Add the following to the beginning of paragraph 3 of A: "For pay factors based on Quality Level Analysis, and"

SPECIAL PROVISION SECTION 107
TIME

107.3.1 General Add the following: "If a Holiday occurs on a Sunday, the following Monday shall be considered a Holiday. Sunday or Holiday work must be approved by the Department, except that the Contractor may work on Martin Luther King Day, President's Day, Patriot's Day, the Friday after Thanksgiving, and Columbus Day without the Department's approval."

SPECIAL PROVISION SECTION 108
PAYMENT

108.4 Payment for Materials Obtained and Stored First paragraph, second sentence, delete the words "…Delivered on or near the Work site at acceptable storage places."

SPECIAL PROVISION SECTION 109
CHANGES

109.1.1 Changes Permitted Add the following to the end of the paragraph: "There will be no adjustment to Contract Time due to an increase or decrease in quantities, compared to those estimated, except as addressed through Contract Modification(s)."

109.1.2 Substantial Changes to Major Items Add the following to the end of the paragraph: "Contract Time adjustments may be made for substantial changes to Major Items when the change affects the Critical Path, as determined by the Department"

109.4.4 Investigation / Adjustment In the third sentence, delete the words "subsections (A) - (E)"

109.7.2 Basis of Payment Replace with the following: "Equitable Adjustments will be established by mutual Agreement for compensable items listed in Section 109.7.3- Compensable Items, based upon Unit or Lump Sum Prices. If Agreement cannot be reached, the Contractor shall accept payment on a Force Account basis as provided in Section 109.7.5 - Force Account Work, as full and complete compensation for all Work relating to the Equitable Adjustment."

109.7.3 Compensable Items Replace with the following: "The Contractor is entitled to compensation for the following items, with respect to agreed upon Unit or Lump Sum Prices:

1. Labor expenses for non-salaried Workers and salaried foremen.

2. Costs for Materials.

3. A markup on the totals of Items 1 and 2 of this subsection 109.7.3 for home office overhead and profit of the Contractor, its Subcontractors and suppliers, and any lower tier Subcontractors or suppliers, with no mark-ups on mark-ups.

4. Cost for Equipment, based on Blue Book Rates or leased rates, as set forth in Section 109.7.5(C), or the Contractor's Actual Costs.

5. Costs for extended job-site overhead.

6. Time.

7. Subcontractor quoted Work, as set forth below in Section 109.7.5 (F)."

109.7.5 Force Account Work

C. Equipment

Paragraph 2, delete sentence 1 which starts; "Equipment leased…."

Paragraph 6, change sentence 2 from "The Contractor may furnish…" to read "If requested by the Department, the Contractor will produce cost data to assist the Department in the establishment of such rental rate, including all records that are relevant to the Actual Costs including rental Receipts, acquisition costs, financing documents, lease Agreements, and maintenance and operational cost records."

Add the following paragraph; "Equipment leased by the Contractor for Force Account Work and actually used on the Project will be paid for at the actual invoice amount plus 10% markup for administrative costs."

Add the following section;

"F. Subcontractor Quoted Work When accomplishing Force Account Work that utilizes Subcontractor quoted Work, the Contractor will be allowed a maximum markup of 5% for profit and overhead."

SPECIAL PROVISION SECTION 401
HOT MIX ASPHALT PAVEMENT

401.18 Quality Control Method A & B Make the following change to paragraph a. QCP Administrator; in the final sentence, change "…certified as a Plant Technician or Paving Inspector…" to "…certified as a Quality Assurance Technologist…"

401.201 Method A Under a. Lot Size, add the following; "Each lot will be divided into a minimum of four sublots for mix properties and five sublots for percent TMD."

SPECIAL PROVISION SECTION 402
PAVEMENT SMOOTHNESS

Add the following: "Projects to have their pavement smoothness analyzed in accordance with this Specification will be so noted in Special Provision 403 - Bituminous Box."

"402.02 Lot Size Lot size for smoothness will be 1000 lane-meters [3000 lane-feet]. A sublot will consist of 20 lane-meters [50 lane-feet]. Partial lots will be included in the previous lot if less than one-half the size of a normal lot. If greater than one-half the normal lot size, it will be tested as a separate lot."

SPECIAL PROVISION SECTION 502
STRUCTURAL CONCRETE

502.0502 Quality Assurance Method A - Rejection by Resident Change the first sentence to read: "For an individual sublot with test results failing to meet the criteria in Table #1, or if the calculated pay factor for Air Content is less than 0.80……"

502.0503 Quality Assurance Method B - Rejection by Resident Change the first sentence to read: "For material represented by a verification test with test results failing to meet the criteria in Table #1, the Department will……"

502.0505 Resolution of Disputed Acceptance Test Results Combine the second and third sentence to read: "Circumstances may arise, however, where the Department may ……"

SPECIAL PROVISION SECTION 504
REINFORCING STEEL

504.18 Plates for Fabricated Members Change the second paragraph, first sentence from: "…ASTM A 898/A 898 M…" to "…ASTM A 898/A 898 M or ASTM A 435/A 435 M as applicable and…"

SPECIAL PROVISION SECTION 535
PRECAST, PRESTRESSED CONCRETE SUPERSTRUCTURE

535.02 Materials Change "Steel Strand for Concrete Reinforcement" to "Steel Strand." Add the following to the beginning of the third paragraph; "Concrete shall be Class P conforming to the requirements in this section. 28 day compressive strength shall be as stated on the plans. Coarse aggregate…."

535.26 Lateral Post-Tensioning Replace the first paragraph; "A final tension…" with "Overstressing strands for setting losses cannot be accomplished for chuck to chuck lengths of 7.6 m [25 ft] and less. In such instances, refer to the Plans for all materials and methods. Otherwise, post-tensioning shall be in accordance with PCI standards and shall provide the anchorage force noted in the Plans. The applied jacking force shall be no less than 100% of the design jacking force."

SPECIAL PROVISION SECTION 604
MANHOLES, INLETS, AND CATCH BASINS

604.02 Materials Add the following:

"Tops and Traps	712.07
Corrugated Metal Units	712.08
Catch Basin and Manhole Steps	712.09"

SPECIAL PROVISION SECTION 615
LOAM

615.02 Materials Make the following change:

Organic Content	Percent by Volume
Humus	"5% - 10%", as determined by Ignition Test

SPECIAL PROVISION SECTION 618
SEEDING

618.01 Description Change the first sentence to read as follows: "This work shall consist of furnishing and applying seed ….." Also remove ",and cellulose fiber mulch" from 618.01(a).

618.03 Rates of Application In 618.03(a), remove the last sentence and replace with the following: "These rates shall apply to Seeding Method 2, 3, and Crown Vetch."

In 618.03(c) "1.8 kg [4 lb]/unit." to "1.95 kg [4 lb]/unit."

618.09 Construction Method In 618.09(a) 1, sentence two, replace "100 mm [4 in]" with "25 mm [1 in] (Method 1 areas) and 50 mm [2 in] (Method 2 areas)"

618.15 Temporary Seeding Change the Pay Unit from Unit to Kg [lb].

SPECIAL PROVISION SECTION 620
GEOTEXTILES

620.03 Placement Section (c)

Title: Replace "Non-woven" in title with "Erosion Control".
First Paragraph: Replace first word "Non-woven" with "Woven monofilament".
Second Paragraph: Replace second word "Non-woven" with "Erosion Control".

620.07 Shipment, Storage, Protection and Repair of Fabric Section (a)

Replace the third sentence with the following: "Damaged geotextiles, as identified by the Resident, shall be repaired immediately."

620.09 Basis of Payment

Pay Item 620.58: Replace "Non-woven" with "Erosion Control"
Pay Item 620.59: Replace "Non-woven" with "Erosion Control"

SPECIAL PROVISION SECTION 626
HIGHWAY SIGNING

626.034 Concrete Foundations Add to the following to the end of the second paragraph: "Pre-cast and cast-in-place foundations shall be warranteed against leaning and corrosion for two years after the project is completed. If the lean is greater than 2 degrees from normal or the foundation is spalling within the first two years, the Contractor shall replace the foundation at no extra cost."

SPECIAL PROVISION SECTION 637
DUST CONTROL

637.06 Basis of Payment Add the following after the second sentence of the third paragraph: "Failure by the Contractor to follow Standard Specification or Special Provision - Section 637 and/or the Contractor's own Soil Erosion and Pollution Control Plan concerning Dust Control and/or the Contractor's own Traffic Control Plan concerning Dust Control and/or visible evidence of excessive dust problems, as determined by the Resident, will result in a reduction in payment, computed by reducing the Lump Sum Total by 5% per occurrence per day. The Department's Resident or any other representative of the Department reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Department shall not be held responsible for any delay in the work due to any suspension under this item. Additional penalties may also be assessed in accordance with Special Provision 652 - Work Zone Traffic Control and Standard Specification 656 - Temporary Soil Erosion and Water Pollution Control."

SPECIAL PROVISION SECTION 639
ENGINEERING FACILITIES

639.04 Field Offices Change the forth to last paragraph from: "The Contractor shall provide a fully functional desktop copier…" to "….desktop copier/scanner…"

SPECIAL PROVISION SECTION 652
MAINTENANCE OF TRAFFIC

652.8.2 Other Items Replace the last paragraph with the following: "There will be no payment made under any 652 pay items after the expiration of the adjusted total contract time."

SPECIAL PROVISION SECTION 656
TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL

656.5.1 If Pay Item 656.75 Provided Replace the second paragraph with the following: "Failure by the Contractor to follow Standard Specification or Special Provision - Section 656 and/or the Contractor's own Soil Erosion and Pollution Control Plan will result in a reduction in payment, computed by reducing the Lump Sum Total by 5% per occurrence per day. The Department's Resident or any other representative of the Department reserves the right to suspend the work at any time and request a meeting to discuss violations and remedies. The Department shall not be held responsible for any delay in the work due to any suspension under this item."

SPECIAL PROVISION SECTION 703
AGGREGATES

703.06 Aggregate for Base and Subbase Delete the first paragraph: "The material shall have…" and replace with "The material shall have a minimum degradation value of 15 as determined by Washington State DOT Test Method T113, Method of Test for Determination of Degradation Value (March 2002 version), except that the reported degradation value will be the result of testing a single specimen from that portion of a sample that passes the 12.5 mm [½ in] sieve and is retained on the 2.00 mm [No. 10] sieve, minus any reclaimed asphalt pavement used."

703.07 Aggregates for HMA Pavements Delete the forth paragraph: "The composite blend shall have…" and replace with "The composite blend, minus any reclaimed asphalt pavement used, shall have a Micro-Deval value of 18.0 or less as determined by AASHTO TP 58. In the event the material exceeds the Micro Deval limit, a Washington Degradation test shall be performed. The material shall be acceptable if it has a value of 30 or more as determined by Washington State DOT Test Method T 113, Method of Test for Determination of Degradation Value (March 2002 version) except that the reported degradation value will be the result of testing a single composite specimen from that portion of the sample that passes the 12.5mm [1/2 inch] sieve and is retained on the 2.00mm [No 10] sieve, minus any reclaimed asphalt pavement used."

703.22 Underdrain Backfill Material Change the first paragraph from "…for Underdrain Type B…" to "…for Underdrain Type B and C…"

SPECIAL PROVISION SECTION 709
REINFORCING STEEL AND WELDED STEEL WIRE FABIC

709.03 Steel Strand Change the second paragraph from "…shall be 12mm [½ inch] AASHTO M203M/M203 (ASTM A416/A416M)…" to "…shall be 15.24 mm [0.600 inch] diameter AASHTO M203 (ASTM A416)…"

SPECIAL PROVISION SECTION 712
MISCELLANEOUS HIGHWAY MATERIALS

Add the following:

"712.07 Tops, and Traps These metal units shall conform to the plan dimensions and to the following specification requirements for the designated materials.

Gray iron castings shall conform to the requirements of AASHTO M105, Class 30, unless otherwise designated.

Carbon steel castings shall conform to the requirements of AASHTO M103/M103M. Grade shall be 450-240 [65-35] unless otherwise designated.

Structural steel shall conform to the requirements of AASHTO M183/M183M or ASTM A283/A283M, Grade B or better. Galvanizing, where specified for these units, shall conform to the requirements of AASHTO M111.

712.08 Corrugated Metal Units The units shall conform to plan dimensions and the metal to AASHTO M36/M36M. Bituminous coating, when specified, shall conform to AASHTO M190 Type A.

712.09 Catch Basin and Manhole Steps Steps for catch basins and for manholes shall conform to ASTM C478M [ASTM C478], Section 13 for either of the following material:

(a) Aluminum steps-ASTM B221M, [ASTM B211] Alloy 6061-T6 or 6005-T5.

(b) Reinforced plastic steps Steel reinforcing bar with injection molded plastic coating copolymer polypropylene. Polypropylene shall conform to ASTM D 4101.

712.23 Flashing Lights Flashing Lights shall be power operated or battery operated as specified.

(a) Power operated flashing lights shall consist of housing, adapters, lamps, sockets, reflectors, lens, hoods and other necessary equipment designed to give clearly visible signal indications within an angle of at least 45 degrees and from 3 to 90 m [10 to 300 ft] under all light and atmospheric conditions.

Two circuit flasher controllers with a two-circuit filter capable of providing alternate flashing operations at the rate of not less than 50 nor more than 60 flashes per minute shall be provided.

The lamps shall be 650 lumens, 120 volt traffic signal lamps with sockets constructed to properly focus and hold the lamp firmly in position.
The housing shall have a rotatable sun visor not less than 175 mm [7 in] in length designed to shield the lens.

Reflectors shall be of such design that light from a properly focused lamp will reflect the light rays parallel. Reflectors shall have a maximum diameter at the point of contact with the lens of approximately 200 mm [8 in].

The lens shall consist of a round one-piece convex amber material which, when mounted, shall have a visible diameter of approximately 200 mm [8 in]. They shall distribute light and not diffuse it. The distribution of the light shall be asymmetrical in a downward direction. The light distribution of the lens shall not be uniform, but shall consist of a small high intensity portion with narrow distribution for long distance throw and a larger low intensity portion with wide distribution for short distance throw. Lenses shall be marked to indicate the top and bottom of the lens.

(b) Battery operated flashing lights shall be self- illuminated by an electric lamp behind the lens. These lights shall also be externally illuminated by reflex-reflective elements built into the lens to enable it to be seen by reflex-reflection of the light from the headlights of oncoming traffic. The batteries must be entirely enclosed in a case. A locking device must secure the case. The light shall have a flash rate of not less than 50 nor more than 60 flashes per minute from minus 30 °C [minus 20 °F] to plus 65 °C [plus 150 °F]. The light shall have an on time of not less than 10 percent of the flash cycle. The light beam projected upon a surface perpendicular to the axis of the light beam shall produce a lighted rectangular projection whose minimum horizontal dimension shall be 5 degrees each side of the horizontal axis. The effective intensity shall not have an initial value greater than 15.0 candelas or drop below 4.0 candelas during the first 336 hours of continuous flashing. The illuminated lens shall appear to be uniformly bright over its entire illuminated surface when viewed from any point within an angle of 9 degrees each side of

the vertical axis and 5 degrees each side of the horizontal axis. The lens shall not be less than 175 mm [7 in] in diameter including a reflex-reflector ring of 13 mm [½ in] minimum width around the periphery. The lens shall be yellow in color and have a minimum relative luminous transmittance of 0.440 with a luminance of 2854° Kelvin. The lens shall be one-piece construction. The lens material shall be plastic and meet the luminous transmission requirements of this specification. The case containing the batteries and circuitry shall be constructed of a material capable of withstanding abuse equal to or greater than 1.21 mm thick steel [No. 18 U.S. Standard Gage Steel]. The housing and the lens frame, if of metal shall be properly cleaned, degreased and pretreated to promote adhesion. It shall be given one or more coats of enamel which, when dry shall completely obscure the metal. The enamel coating shall be of such quality that when the coated case is struck a light blow with a sharp tool, the paint will not chip or crack and if scratched with a knife will not powder. The case shall be so constructed and closed as to exclude moisture that would affect the proper operation of light. The case shall have a weep hole to allow the escape of moisture from condensation. Photoelectric controls, if provided, shall keep the light operating whenever the ambient light falls below 215 lx [20 foot candles]. Each light shall be plainly marked as to the manufacturer's name and model number.

If required by the Resident, certification as to conformance to these specifications shall be furnished based on results of tests made by an independent testing laboratory. All lights are subject to random inspection and testing. All necessary random samples shall be provided to the Resident upon request without cost to the Department. All such samples shall be returned to the Contractor upon completion of the tests.

712.32 Copper Tubing Copper tubing and fittings shall conform to the requirements of ASTM B88M Type A [ASTM B88, Type K] or better.

712.33 Non-metallic Pipe, Flexible Non-metallic pipe and pipe fittings shall be acceptable flexible pipe manufactured from virgin polyethylene polymer suitable for transmitting liquids intended for human or animal consumption.

712.34 Non-metallic Pipe, Rigid Non-metallic pipe shall be Schedule 40 polyvinylchloride (PVC) that meets the requirement of ASTM D1785. Fittings shall be of the same material.

712.341 Metallic Pipe Metallic pipe shall be ANSI, Standard B36.10, Schedule 40 steel pipe conforming to the requirements of ASTM A53 Types E or S, Grade B. End plates shall be steel conforming to ASTM A36/A36M.

Both the sleeve and end plates shall be hot dip galvanized. Pipe sleeve splices shall be welded splices with full penetration weld before galvanizing.

712.35 Epoxy Resin Epoxy resin for grouting or sealing shall consist of a mineral filled thixotropic, flexible epoxy resin having a pot life of approximately one hour at 10°C [50°F]. The grout shall be an approved product suitable for cementing steel dowels into the preformed holes of curb inlets and adjacent curbing. The sealant shall be an approved product, light gray in color and suitable for coating the surface.

712.36 Bituminous Curb The asphalt cement for bituminous curb shall be of the grade required for the wearing course, or shall be Viscosity Grade AC-20 meeting the current requirements of Subsection 702.01 Asphalt Cement. The aggregate shall conform to the requirements of Subsection 703.07. The coarse aggregate portion retained on the 2.36 mm [No. 8] sieve may be either crushed rock or crushed gravel.

The mineral constituents of the bituminous mixture shall be sized and graded and combined in a composite blend that will produce a stable durable curbing with an acceptable texture.
Bituminous material for curb shall meet the requirements of Section 403 - Hot Bituminous Pavement.

712.37 Precast Concrete Slab Portland cement concrete for precast slabs shall meet the requirements of Section 502 - Structural Concrete, Class A.

The slabs shall be precast to the dimension shown on the plans and cross section and in accordance with the Standard Detail plans for Concrete Sidewalk Slab. The surface shall be finished with a float finish in accordance with Subsection 502.14(c). Lift devices of sufficient strength to hold the slab while suspended from cables shall be cast into the top or back of the slab.

712.38 Stone Slab Stone slabs shall be of granite from an acceptable source, hard, durable, predominantly gray in color, free from seams which impair the structural integrity and be of smooth splitting character. Natural color variations characteristic of the deposit will be permitted. Exposed surfaces shall be free from drill holes or indications of drill holes. The granite slabs in any one section of backslope must be all the same finish.

The granite slabs shall be scabble dressed or sawed to an approximately true plane having no projections or depressions over 13 mm [½ in] under a 600 mm [2 ft] straightedge or over 25 mm [1 in] under a 1200 mm [4 ft] straightedge. The arris at the intersection of the top surface and exposed front face shall be pitched so that the arris line is uniform throughout the length of the installed slabs. The sides shall be square to the exposed face unless the slabs are to be set on a radius or other special condition which requires that the joints be cut to fit, but in any case shall be so finished that when the stones are placed side by side no space more than 20 mm [3/4 in] shall show in the joint for the full exposed height.

Liftpin holes in all sides will be allowed except on the exposed face.

SPECIAL PROVISION SECTION 717
ROADSIDE IMPROVEMENT MATERIAL

717.05 Mulch Binder. Change the third sentence to read as follows:

"Paper fiber mulch may be used as a binder at the rate of 2.3 kg/unit [5 lb/unit]."

SPECIFICATIONS

FOR

STATE OF MAINE

DEPARTMENT OF TRANSPORTATION

SAND/SALT STORAGE BUILDINGS

EDDINGTON, MEDWAY,

SOLON, WALDOBORO

FEBRUARY 13, 2004

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SECTION 02110 - SITE CLEARING

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes the following:

Removal of trees and other vegetation.

Topsoil stripping.

Clearing and grubbing.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

SITE CLEARING

General: Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.

Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.

Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.

Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.

Dispose of unsuitable or excess topsoil as specified for disposal of waste material.

Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.

Completely remove stumps, roots, and other debris protruding through ground surface.

Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.

DISPOSAL OF WASTE MATERIALS

Burning on Owner's Property: Burning is not permitted on Owner's property.

Removal from Owner's Property: Remove waste materials from Owner's property.

END OF SECTION 02110

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes the following:

Preparing and grading subgrades for pavements and landscaping.

Excavating and backfilling for buildings and structures.

Subbase course for pavements.

Subsurface drainage backfill for walls and trenches.

Excavating and backfilling for underground electrical utilities and appurtenances.

Related Sections: The following Sections contain requirements that relate to this Section.

Division 2 Section "Site Clearing" for site stripping, grubbing, topsoil removal, and tree protection.

Division 2 Section "Foundation Drainage Systems" for footings, underslab, and wall drainage.

UNIT PRICES

Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following:

24 inches outside of concrete forms other than at footings.

12 inches outside of concrete forms at footings.

6 inches outside of minimum required dimensions of concrete cast against grade.

6 inches beneath bottom of concrete slabs on grade.

6 inches beneath invert elevation of pipe in trenches, and the greater of 24 inches wider than pipe diameter or 42 inches wide.

Unit prices for rock excavation include replacement with approved materials.

DEFINITIONS

Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.

Base Course: The layer placed between the subbase and surface pavement in a paving system.

Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.

Structures: Buildings, footings, foundations, retaining walls, and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

Blasting plan approved by authorities having jurisdiction.

QUALITY ASSURANCE

Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.

Comply with applicable requirements of NFPA 495--Explosive Materials Code.

Testing and Inspection Service: Owner will employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.

PART 2 - PRODUCTS

SOIL MATERIALS

Satisfactory Soil Materials: AASHTO M 145 soil classification groups A-1, A-2-4, A-2-5, and A-3; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

Unsatisfactory Soil Materials: AASHTO M 145 soil classification groups A-2-6, A-2-7, A-4, A-5, A-6 and A-7.

Backfill and Fill Materials: Satisfactory soil materials conforming with Maine Department of Transportation Materials Specification 703.18.

Subbase and Base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, conforming to Maine Department fo Transportation Materials Specification 703.06, Type A for base course and Type D for subbase course.

Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 50 sieve.

Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

ACCESSORIES

Filter Fabric: Manufacturer's standard nonwoven pervious geotextile fabric of polypropylene, nylon or polyester fibers, or a combination.

Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D 4759 and the referenced standard test method in parentheses:

Grab Tensile Strength (ASTM D 4632): 100 lb.

Apparent Opening Size (ASTM D 4751): #100 U.S. Standard sieve.

Permeability (ASTM D 4491): 150 gallons per minute per sq. ft.

PART 3 - EXECUTION

PREPARATION

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

DEWATERING

Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

EXCAVATION

Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to the site or using explosives on the site.

Do not damage adjacent structures, property, or site improvements or weaken the bearing capacity of rock subgrade when using explosives.

Classified Excavation: Excavation is classified and includes excavation to required subgrade elevations. Excavation will be classified as earth excavation or rock excavation as follows:

Earth excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with soil and other materials encountered that are not classified as rock or unauthorized excavation.

Intermittent drilling, blasting, or ripping to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

Rock excavation includes removal and disposal of rock material and obstructions encountered that cannot be removed by the following heavy-duty rock excavating equipment without systematic drilling, blasting, or ripping.

Rock material includes boulders 1/2 cu. yd. or more in volume and rock in beds, ledges, unstratified masses, and conglomerate deposits.

Rock excavating equipment for footings, trenches, and pits shall be equivalent to Caterpillar Model No. 215D LC track-mounted hydraulic excavator, equipped with a 42-inch-wide short-tip radius rock bucket, rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lb and stick-crowd force of not less than 18,700 lb, measured according to SAE Standard J1179.

Rock-excavating equipment for open excavations shall be equivalent to Caterpillar Model No. 973, heavy-duty, track-mounted loader, rated at not less than 210-hp flywheel power and developing minimum of 45,000-lb breakout force, measured according to SAE Standard J732c-69.

Excavations for building construction are defined as open excavations.

Rock excavation will be paid by unit prices included in the Contract Documents.

Do not excavate rock until it has been classified and cross-sectioned by Architect.

STABILITY OF EXCAVATIONS

Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

EXCAVATION FOR STRUCTURES

Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.

Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

EXCAVATION FOR PAVEMENTS

Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

APPROVAL OF SUBGRADE

Notify Architect when excavations have reached required subgrade.

When Architect determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in Work.

Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect.

UNAUTHORIZED EXCAVATION

Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Architect.

Fill unauthorized excavations under other construction as directed by the Architect.

STORAGE OF SOIL MATERIALS

Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.

Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

BACKFILL

Backfill excavations promptly, but not before completing the following:

Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter drainage.

Concrete formwork removal.

Removal of trash and debris from excavation.

Removal of temporary shoring and bracing, and sheeting.

SUBSURFACE DRAINAGE BACKFILL

Subsurface Drain: Place a layer of filter fabric around perimeter of drainage trench or at footing, as indicated. Place a 6-inch compacted course of filtering material on filter fabric to support drainage pipe. After installing and testing, encase drainage pipe in a minimum of 6 inches of compacted filtering material and wrap in filter fabric, overlapping edges at least 6 inches.

Drainage Backfill: Place and compact drainage backfill of filtering material over subsurface drain, in width indicated, to within 12 inches of final subgrade. Overlay drainage backfill with one layer of filter fabric, overlapping edges at least 6 inches.

Impervious Fill: Place and compact impervious fill material over drainage backfill to final subgrade.

FILL

Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.

Place fill material in layers to required elevations for each location listed below.

Under grass, use satisfactory excavated loam.

Under pavements, use subbase or base material, or satisfactory excavated or borrow soil material.

MOISTURE CONTROL

Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.

Stockpile or spread and dry removed wet satisfactory soil material.

COMPACTION

Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.

Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D 1557:

Under pavements, compact the top 12 inches below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.

GRADING

General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

Provide a smooth transition between existing adjacent grades and new grades.

Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

Lawn or Unpaved Areas: Plus or minus 0.10 foot.

Pavements: Plus or minus 1/2 inch.

Grading Inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

SUBBASE AND BASE COURSES

Under pavements, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.

Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 95 percent of ASTM D 4254 relative density.

Shape subbase and base to required crown elevations and cross-slope grades.

When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.

When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

FIELD QUALITY CONTROL

Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable.

Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 3017.

When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.

Paved Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 sq. ft. or less of paved area, but in no case fewer than three tests.

Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.

When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.

PROTECTION

Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.

Scarify or remove and replace material to depth directed by the Architect; reshape and recompact at optimum moisture content to the required density.

Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

DISPOSAL OF SURPLUS AND WASTE MATERIALS

Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 02200

SECTION 02511 - HOT-MIX ASPHALT PAVING

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes the following:

Hot-mix asphalt paving.

Related Sections include the following:

Division 2 Section "Earthwork" for aggregate subbase and base courses and aggregate pavement shoulders.

SYSTEM DESCRIPTION

Provide hot-mix asphalt pavement according to the materials, workmanship, and other applicable requirements of the standard specifications of the State of Maine Department of Transportation.

Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

SUBMITTALS

Product Data: For each product specified. Include technical data and tested physical and performance properties.

Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

QUALITY ASSURANCE

Installer Qualifications: Engage an experienced installer who has completed hot-mix asphalt paving similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

Manufacturer Qualifications: Engage a firm experienced in manufacturing hot-mix asphalt similar to that indicated for this Project and with a record of successful in-service performance.

Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings" Review methods and procedures related to asphalt paving including, but not limited to, the following:

Review condition of substrate and preparatory work performed by other trades.

Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

Review and finalize construction schedule for paving and related work. Verify availability of materials, paving Installer's personnel, and equipment required to execute the Work without delays.

Review forecasted weather conditions and procedures for coping with unfavorable conditions.

PROJECT CONDITIONS

Environmental Limitations: Do not apply asphalt materials if substrate is wet or excessively damp or if the following conditions are not met:

Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.

Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

AGGREGATES

General: Use materials and gradations that have performed satisfactorily in previous installations.

Coarse Aggregate: Sound; angular crushed stone; crushed gravel; or properly cured, complying with ASTM D 692.

Fine Aggregate: Sharp-edged natural sand or sand prepared from stone; gravel, or combinations thereof; complying with ASTM D 1073.

For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with ASTM D 242.

ASPHALT MATERIALS

Asphalt Cement: AASHTO M 226 for viscosity-graded material, to conform to State of Maine Department of Transportation Specification 702.01.

MIXES

Hot-Mix Asphalt: Provide dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures to current MDOT-approved Superpave job-mix formula, and complying wit the following requirements:

Provide mixes with a history of satisfactory performance in geographical area where Project is located.

Base Course: State of Maine Department of Transportation 703.07 and 703.09, Superpave 19 mm mix.

Surface Course: State of Maine Department of Transportation 703.07 and 703.09, Superpave 12.5 mm mix.

PART 3 - EXECUTION

EXAMINATION

Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

Notify Architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.

SURFACE PREPARATION

General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

HOT-MIX ASPHALT PLACING

Machine place hot-mix asphalt mix on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness, when compacted.

Place hot-mix asphalt base course in one lift.

Place hot-mix asphalt surface course in single lift.

Spread mix at minimum temperature of 250 deg F.

Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.

Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

Place paving in consecutive strips not less than 10 feet wide, except where infill edge strips of a lesser width are required.

After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete asphalt base course for a section before placing asphalt surface course.

Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

JOINTS

Construct joints to ensure continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

Clean contact surfaces and apply tack coat.

Offset longitudinal joints in successive courses a minimum of 6 inches.

Offset transverse joints in successive courses a minimum of 24 inches.

Construct transverse joints by bulkhead method or sawed vertical face method as described in AI's "The Asphalt Handbook."

Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

Compact asphalt at joints to a density within 2 percent of specified course density.

COMPACTION

General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

Complete compaction before mix temperature cools to 185 deg F.

Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt, and rerolling to required elevations.

Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling, while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

Average Density: 96 percent of reference laboratory density according to ASTM D 1559, but not less than 94 percent nor greater than 100 percent.

Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method.

Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving course over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

INSTALLATION TOLERANCES

Thickness: Compact each course to produce the thickness indicated within the following tolerances:

Base Course: Plus or minus 1/2 inch.

Surface Course: Plus 1/4 inch, no minus.

Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

Base Course: 3/8 inch.

Surface Course: 1/4 inch.

END OF SECTION 02511

SECTION 02711 - FOUNDATION DRAINAGE SYSTEMS

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes foundation, subsoil drainage systems.

Related Sections: The following Sections contain requirements that relate to this Section:

Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

QUALITY ASSURANCE

Installer Qualifications: Engage an experienced Installer who has completed foundation drainage systems similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

COORDINATION

Coordinate foundation drainage system installation with excavating, trenching, and backfilling.

PART 2 - PRODUCTS

MANUFACTURERS

Products: Subject to compliance with requirements, provide one of the following:

PIPES AND FITTINGS

General: Include pipes, fittings, couplings, and joint materials.

Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 3034, SDR 35, bell-and-spigot ends, for gasketed joints.

Gaskets: ASTM F 477, elastomeric seal.

Perforated, Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

SOIL MATERIALS

Impervious Fill: Clayey gravel and sand mixture capable of compacting to dense state.

Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate, Size No. 57, with 100 percent passing 1-1/2-inch sieve and not more than 5 percent passing No. 8 sieve.

FILTER FABRIC

Filter Fabric: Manufacturer's standard nonwoven pervious geotextile fabric of polypropylene, nylon or polyester fibers, or a combination.

Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D 4759 and the referenced standard test method in parentheses:

Grab Tensile Strength (ASTM D 4632): 100 lb.

Apparent Opening Size (ASTM D 4751): #100 U.S. Standard sieve.

Permeability (ASTM D 4491): 150 gallons per minute per sq. ft.

PART 3 - EXECUTION

EXAMINATION

Examine surfaces and areas for suitable conditions where foundation drainage systems are to be installed. Do not proceed until unsatisfactory conditions have been corrected.

FOUNDATION DRAINAGE SYSTEM APPLICATIONS

Systems with 4-Inch Piping: As follows:

Perforated, polyvinyl chloride (PVC) sewer pipe and fittings for loose, bell-and-spigot joints.

PIPING INSTALLATION

Drawing plans and details indicate general location and arrangement of foundation drainage system piping.

Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing, solidly in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.

Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 36 inches, except where otherwise indicated.

Provide recesses in excavation bottom to receive bells of pipe bell ends. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

Apply and compact impervious fill material to raise low areas or where unsatisfactory bearing soil may occur.

Extend piping and connect to storm drainage system, of sizes and in locations indicated. Terminate piping as indicated.

PIPE JOINT CONSTRUCTION AND INSTALLATION

General: Join and install pipe and fittings as indicated and according to the following.

Polyvinyl Chloride (PVC) Pipe and Fittings: As follows:

Join ASTM D 2729 perforated, sewer pipe and fittings with loose, bell-and-spigot joints.

Install according to ASTM D 2321.

Install perforated pipe with perforations down.

SOIL MATERIAL INSTALLATION

Impervious Fill at Footings: Place impervious fill material on subgrade adjacent to bottom of footing after concrete footings have been cured and forms removed. Place and compact impervious fill to dimensions indicated but not less than 6 inches deep and 12 inches wide.

Filtering Material: Place supporting layer of filtering material over compacted subgrade where drainage pipe is to be laid to depth indicated or, if not indicated, to compacted depth of not less than 4 inches.

Drainage Fill: Place fill over drain piping after satisfactory testing and covering with filtering material. Cover piping to width of at least 6 inches on each side and above top of pipe to within 12 inches of finish grade. Place fill material in layers not exceeding 3 inches in loose depth, and compact each layer placed.

Fill to Grade: Place impervious fill material over compacted drainage fill. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish elevations and slope away from building.

FIELD QUALITY CONTROL

Testing: Test drain piping with water or visually check piping to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

Place additional filtering material to depth of 4 inches around sides and top of drains after testing.

END OF SECTION 02711

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.

Cast-in-place concrete includes the following:

Foundations and footings.

Foundation walls.

QUALITY ASSURANCE

Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."

ACI 318, "Building Code Requirements for Reinforced Concrete."

Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."

PART 2 - PRODUCTS

FORM MATERIALS

Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration to match Architect/Engineer's control sample. Provide solid backing and form supports to ensure stability of textured form liners.

Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1/2 inches to the plane of the exposed concrete surface.

REINFORCING MATERIALS

Reinforcing Bars: ASTM A 615, Grade 60, deformed.

Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

CONCRETE MATERIALS

Portland Cement: ASTM C 150, Type II.

Use one brand of cement throughout Project unless otherwise acceptable to Architect/Engineer.

Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete. Use 3/4 inch maximum aggregate for all concrete.

For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.

Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect/Engineer.

Water: Potable.

Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

Products: Subject to compliance with requirements, provide one of the following:

Air-Tite, Cormix Construction Chemicals.
Air-Mix or Perma-Air, Euclid Chemical Co.
Darex AEA or Daravair, W.R. Grace & Co.
MB-VR or Micro-Air, Master Builders, Inc.
Sealtight AEA, W.R. Meadows, Inc.
Sika AER, Sika Corp.

RELATED MATERIALS

Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

Waterproof paper.

Polyethylene film.

Polyethylene-coated burlap.

Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

Products: Subject to compliance with requirements, provide one of the following:

A-H 3 Way Sealer, Anti-Hydro Co., Inc.
Spartan-Cote, The Burke Co.
Conspec #1, Conspec Marketing & Mfg. Co.
Sealco 309, Cormix Construction Chemicals.
Day-Chem Cure and Seal, Dayton Superior Corp.
Eucocure, Euclid Chemical Co.
Horn Clear Seal, A.C. Horn, Inc.
L&M Cure R, L&M Construction Chemicals, Inc.
Masterkure, Master Builders, Inc.
CS-309, W.R. Meadows, Inc.
Seal N Kure, Metalcrete Industries.
Kure-N-Seal, Sonneborn-Chemrex.
Stontop CS2, Stonhard, Inc.

PROPORTIONING AND DESIGNING MIXES

Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:

3000-psi, 28-day compressive strength; water-cement ratio, 0.54 maximum (air-entrained).

Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:

Subjected to de-icers/watertight: W/C 0.54.

Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

Reinforced foundation systems: Not less than 1 inch and not more than 3 inches, with plastisizer, not more than 7 inches.

Other concrete: Not more than 4 inches.

ADMIXTURES

Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:

Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:

6.0 percent (severe exposure) for 3/4-inch maximum aggregate.

CONCRETE MIXING

Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.

When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

GENERAL

Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

FORMS

General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

Provide Class A tolerances for concrete surfaces exposed to view.

Provide Class C tolerances for other concrete surfaces.

Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

PLACING REINFORCEMENT

General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect/Engineer.

Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

JOINTS

Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect/Engineer.

Provide keyways at least 3/4 inches deep in construction joints in walls.

INSTALLING EMBEDDED ITEMS

General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

PREPARING FORM SURFACES

General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

CONCRETE PLACEMENT

Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.

Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.

Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.

Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect/Engineer.

FINISHING FORMED SURFACES

Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

CONCRETE CURING AND PROTECTION

General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss.

Curing Methods: Cure exterior wall vertical surfaces.

Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

REMOVING FORMS

General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and **provided curing and protection operations are maintained.**

REUSING FORMS

Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect/Engineer.

CONCRETE SURFACE REPAIRS

Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect/Engineer.

Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect/Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

Repair methods not specified above may be used, subject to acceptance of Architect/Engineer.

QUALITY CONTROL TESTING DURING CONSTRUCTION

General: Eploy a testing agency to perform tests and to submit test reports.

Sampling and testing for quality control during concrete placement may include the following, as directed by Architect/Engineer.

Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

Test results will be reported in writing to Architect/Engineer, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concret e strengths and other characteristics have not been attained in the structure, as directed by Architect/Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 03300

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes the following:

Framing with dimension lumber.

Related Sections: The following Sections contain requirements that relate to this Section:

Division 6 Section "Metal-Plate-Connected Wood Trusses."
Division 6 Section "Structural Glued Laminated Timber."

DEFINITIONS

Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise specified.

Exposed Framing: Dimension lumber not concealed by other construction and indicated to receive a painted finish.

DELIVERY, STORAGE, AND HANDLING

Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.

For lumber pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 - PRODUCTS

MANUFACTURERS

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Wood-Preservative-Treated Materials:

Baxter: J. H. Baxter Co.
Chemical Specialties, Inc.
Continental Wood Preservers, Inc.
Hickson Corp.
Hoover Treated Wood Products, Inc.
Osmose Wood Preserving, Inc.

Metal Framing Anchors:

Cleveland Steel Specialty Co.
Harlen Metal Products, Inc.
Silver Metal Products, Inc.
Simpson Strong-Tie Company, Inc.
Southeastern Metals Manufacturing Co., Inc.

LUMBER, GENERAL

Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:

NELMA - Northeastern Lumber Manufacturers Association.

Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps and provide grade-compliance certificates issued by inspection agency.

Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

Provide dressed lumber, S4S, unless otherwise indicated.

Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

WOOD-PRESERVATIVE-TREATED MATERIALS

General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.

Do not use chemicals containing chromium or arsenic.

Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:

Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

DIMENSION LUMBER

General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.

Framing: Provide framing of the following grade and species:

Grade: No. 2.

Species: Spruce-pine-fir south; NELMA.

Grade: Construction, Stud, or No. 3.

Exposed Framing: Provide material hand-selected from lumber of species and grade indicated below for uniformity of appearance and freedom from characteristics that would impair finish appearance.

Species and Grade: As indicated above for construction of same type.

BOARDS

Exposed Boards: Where boards will be exposed in the finished work, provide the following:

Moisture Content: 19 percent maximum.

Species and Grade: Eastern white pine, D Select per NELMA or NLGA rules.

WOOD-BASED STRUCTURAL-USE PANELS, GENERAL

Structural-Use Panel Standards: Provide either all-veneer, mat-formed, or composite panels complying with DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels," unless otherwise indicated. Provide plywood panels complying with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood," where plywood is indicated.

Wall Sheathing: APA-rated sheathing.

Span Rating: As required to suit stud spacing indicated.

STRUCTURAL-USE PANELS FOR BACKING

Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade, C-D Plugged Exposure 1, in thickness indicated or, if not otherwise indicated, not less than 3/4 inch thick.

FASTENERS

General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.

Nails, Wire, Brads, and Staples: FS FF-N-105.

Power-Driven Fasteners: CABO NER-272.

Wood Screws: ASME B18.6.1.

Lag Bolts: ASME B18.2.1.

Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

METAL FRAMING ANCHORS

General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and as follows:

Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with building code in effect for Project.

Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.

Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.

MISCELLANEOUS MATERIALS

Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbonate (IPBC) as its active ingredient.

PART 3 - EXECUTION

INSTALLATION, GENERAL

Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

CABO NER-272 for power-driven staples, P-nails, and allied fasteners.

Published requirements of metal framing anchor manufacturer.

"Table 2305.2--Fastening Schedule" of the BOCA National Building Code.

Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.

Countersink nail heads on exposed carpentry work and fill holes with wood filler.

WOOD FRAMING, GENERAL

Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.

Install framing members of size and at spacing indicated.

Do not splice structural members between supports.

WALL FRAMING

General: Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs. Nail or anchor plates to supporting construction, unless otherwise indicated.

For exterior walls, provide 2-by-8-inch nominal-size wood studs spaced 24 inches o.c., except where otherwise indicated or required.

Construct corners and intersections with 3 or more studs. Provide miscellaneous blocking and framing as shown and as required to support facing materials, fixtures, specialty items, and trim.

Provide continuous horizontal blocking at midheight of single-story partitions over 96 inches high and multistory partitions, using members of 2-inch nominal thickness and of same width as wall or partitions.

Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.

For load-bearing walls, provide triple-jamb studs for openings. Provide headers of depth shown or, if not shown, as recommended by AFPA's "Manual for Wood Frame Construction."

Provide bracing as indicated. Provide one of the following:

Diagonal bracing using nominal-size lumber indicated.

PURLIN FRAMING

Purlins: Install purlins flat at spacing indicated.

END OF SECTION 06100

SECTION 06176 - METAL-PLATE-CONNECTED WOOD TRUSSES (SOLON & WALDOBORO)

PART 1 - GENERAL

SUMMARY

This Section includes the following:

Wood roof trusses.
Truss accessories.

See Division 6 Section "Rough Carpentry" for supplementary framing and permanent bracing.

PERFORMANCE REQUIREMENTS

Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads indicated without exceeding TPI 1 deflection limits.

SUBMITTALS

Product Data: For metal-plate connectors, metal framing anchors, bolts, and fasteners indicated.

Shop Drawings: Show location, pitch, span, camber, configuration, and spacing for each type of truss required; species, sizes, and stress grades of lumber; splice details; type, size, material, finish, design values, orientation, and location of metal connector plates; and bearing details.

Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

Qualification Data: For the following:

Metal-plate manufacturer.
Fabricator.

Research/Evaluation Reports: For the following:

Metal-plate connectors.
Metal framing anchors.

QUALITY ASSURANCE

Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality-control procedures for manufacture of connector plates published in TPI 1.

Manufacturer's responsibilities include preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

Comply with TP1 1, "National Design Standard for Metal Plate Connected Wood Truss Construction," and TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."

Wood Structural Design Standard: Comply with applicable requirements in AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

PART 2 - PRODUCTS

DIMENSION LUMBER

Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

Grade and Species: Any species for truss chord and web members, graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

METAL PRODUCTS

Metal Connector Plates: Fabricate connector plates to comply with TPI 1 from hot-dip galvanized steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation; Designation SS, Grade 33, and not less than 0.036 inch (0.9 mm) thick.

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Alpine Engineered Products, Inc.
CompuTrus, Inc.
Eagle Metal Products.
Jager Industries, Inc.
Mitek Industries, Inc.
Robbins Manufacturing Company.
TEE-LOK Corporation.
Truswal Systems Corporation.

Fasteners: Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

Nails, Wire, Brads, and Staples: FS FF-N-105.
Power-Driven Fasteners: CABO NER-272.
Wood Screws: ASME B18.6.1.
Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).
Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

Metal Framing Anchors: Provide framing anchors made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Alpine Engineered Products, Inc.
Cleveland Steel Specialty Co.
Harlen Metal Products, Inc.
KC Metals Products, Inc.
Silver Metal Products, Inc.
Simpson Strong-Tie Company, Inc.
Southeastern Metals Manufacturing Co., Inc.
United Steel Products Company, Inc.

Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

FABRICATION

Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

PART 3 - EXECUTION

INSTALLATION

Install and brace trusses according to TPI recommendations and as indicated. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchor according to manufacturer's fastening schedules and written instructions.

Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

Install wood trusses within installation tolerances in TPI 1.

Do not cut or remove truss members.

Return wood trusses that are damaged or do not meet requirements to fabricator and replace with trusses that do meet requirements.

END OF SECTION 06176

SECTION 06185 - STRUCTURAL GLUED LAMINATED TIMBER (EDDINGTON & MEDWAY)

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes structural glued laminated timber elements.

Structural glued laminated (glulam) timber is defined to include wood members fabricated from 1-inch or 2-inch nominal thickness lumber, glued face-to-face to a depth of four or more laminations.

Provide connectors, anchors, and accessories necessary to interconnect and secure glulam members to building structure.

The types of structural glued laminated units specified include the following:

Curved or arched structural members (curved glue lines).

SUBMITTALS

General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

Product data including specifications and installation instructions covering lumber, adhesives, fabrication process, preservative treatment, accessories, and protection.

Submit certification indicating glued laminated timbers comply with requirements of ANSI/AITC A190.1.

QUALITY ASSURANCE

Standards: Comply with ANSI/AITC A 190.1, "Structural Glued Laminated Timber."

Manufacturer Qualification: Provide factory-glued structural units, produced by an AITC-licensed firm qualified to apply the AITC Quality Inspected mark.

Factory-mark each piece of glued laminated structural units with AITC Quality Inspected mark.

Place AITC mark on timber surfaces which will not be exposed in completed Work.

DELIVERY, STORAGE, AND HANDLING

General: Comply with provisions of AITC 111, "Recommended Practice for Protection of Structural Glued Laminated Timber During Transit, Storage, and Erection."

PART 2 - PRODUCTS

STRUCTURAL GLUED LAMINATED UNITS

Lumber: Comply with ANSI/AITC A190.1 and applicable lumber association standards cited therein for grades required to achieve glulam requirements for design values, appearance, fabrication limitations, and species.

Stress Values for Arches: Provide glued laminated members, sized as shown on drawings, with laminating combinations that meet or exceed following stress values for normal loading duration and dry condition of use:

Combination Symbol: 24F-V9.

Bending (Fb), 2400 psi, both faces.

Horizontal shear (Fv), 155 psi.

Compression perpendicular to grain (Fc-tension face), 500 psi.

Compression perpendicular to grain (Fc-compression face), 500 psi.

Modulus of Elasticity (E), 1,500,000 psi.

Tension parallel to grain (Ft-axially loaded), 975 psi.

Compression parallel to grain (Fc-axially loaded), 1400 psi.

Lumber Species: Any softwood lumber or mixed species at manufacturer's option, as required to comply with other requirements.

Adhesive: ANSI/AITC A190.1, wet-use type.

End Sealer: Manufacturer's standard, transparent, colorless wood sealer, effective in retarding transmission of moisture at cross-grain cuts.

Penetrating Sealer: Manufacturer's standard, translucent, penetrating wood sealer, that will not interfere with application of wood stain and transparent finish, or paint finish.

Connectors, Anchors, and Accessories: Provide fabricated steel (ASTM A 36) shapes, plates, and bars, welded into assemblies of types and sizes indicated. Provide steel bolts (ASTM A 307), lag bolts, nails, and other standard fasteners as required for installation.

Galvanized Finish: Finish fabricated assemblies with hot-dip zinc coating (ASTM A 153), including bolts and other fasteners.

FABRICATION

General: Comply with ANSI/AITC A190.1 in providing units indicated; where dimensions are not completely documented, provide manufacturer's standard sizes and shapes required to fulfill indicated performances.

Shop-fabricate for connections and connecting hardware to greatest extent feasible, including drilling of bolt holes.

Appearance Grade: Provide Industrial appearance grade units complying with AITC 110.

End-Cut Sealing: Immediately after end-cutting each member to final length, and after wood treatment (if any), apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood-coated for not less than 10 minutes.

Seal Coat: After fabricating and sanding each unit, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit, except for treated wood where treatment has included a water repellent.

PART 3 - EXECUTION

INSTALLATION

General: Install miscellaneous steel connectors, anchors, and accessories.

Plan and execute erection procedures so that close fit and neat appearance of joints and structure as a whole will not be impaired. When hoisting members into place, use padded or nonmarring slings, and protect corners with wood blocking.

Adequately brace members as they are placed to maintain safe position until full stability is provided.

Cutting: Avoid cutting glulam members during erection. Except for fastener drilling and other minor cutting, coat cuts with end sealer.

Where treated members must be cut during erection, apply a heavy brush coat of the same preservative treatment, complying with AWPA Standard M4.

Handle and temporarily support members to prevent visible surface damage.

Do not remove wrapping on individually wrapped members until it will serve no useful purpose, including protection from weather, soiling and damage from work of other trades.

Repair damaged surfaces and finishes after completing erection and removing wrappings, or replace damaged members as directed where damage is beyond acceptable repair.

END OF SECTION 06185

SECTION 07160 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes the following:

Cold-applied, rubberized asphalt emulsion dampproofing.

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product data for each type of product specified, including data substantiating that materials comply with requirements for each dampproofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.

QUALITY ASSURANCE

Single-Source Responsibility: Obtain primary dampproofing materials and primers from one source and by a single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

PROJECT CONDITIONS

Substrate: Proceed with dampproofing only after substrate construction and penetrating work have been completed.

Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has thoroughly cured.

PART 2 - PRODUCTS

MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

Cold-Applied, Asphalt Emulsion Dampproofing:

Black Shield KT-42 Professional Grade Rubberized Driveway Sealer.
ChemRex, Inc.; Sonneborn Building Products Div.
Euclid Chemical Co.
Karnak Chemical Corporation.
Koppers Industries, Inc.
Meadows: W.R. Meadows, Inc.

BITUMINOUS DAMPPROOFING

General: Provide products recommended by manufacturer for designated application.

Cold-Applied, Asphalt Emulsion Dampproofing: Asphalt-based emulsions recommended by the manufacturer for dampproofing use when applied according to the manufacturer's instructions.

Semimastic Grade: Emulsified asphalt semimastic, prepared with mineral-colloid emulsifying agents and containing fibers other than asbestos, complying with ASTM D 1227, Type III or IV.

MISCELLANEOUS MATERIALS

Primer: Asphalt primer complying with ASTM D 41, for asphalt-based dampproofing.

PART 3 - EXECUTION

PREPARATION

Clean substrate of projections and substances detrimental to work; comply with recommendations of prime materials manufacturer.

Fill voids, seal joints, and apply bond breakers, if any, as recommended by prime materials manufacturer, with particular attention at construction joints.

Prime substrate as recommended by prime materials manufacturer.

INSTALLATION, GENERAL

Comply with manufacturer's recommendations except where more stringent requirements are indicated and where Project conditions require extra precautions to ensure satisfactory performance of work.

Application: Apply dampproofing to the following surfaces.

All interior concrete surfaces from floor line to top of wall.

COLD-APPLIED, ASPHALT EMULSION DAMPPROOFING

Semimastic Grade: Brush or spray apply a coat of asphalt emulsion dampproofing at a rate of 5 gal./100 sq. ft. (2 L/sq. m), to produce a uniform, dry-film thickness of not less than 30 mils (0.8 mm).

END OF SECTION 07160

SECTION 07460 - SIDING

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes the following:

Galvalume metal siding and roofing

SUBMITTALS

General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

QUALITY ASSURANCE

Single-Source Responsibility for Siding and Accessories: Obtain each color, grade, finish, type, and variety of siding and related accessories from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

DELIVERY, STORAGE, AND HANDLING

Deliver materials to Project site in manufacturer's unopened bundles or containers with labels intact.

Handle and store materials at Project site to prevent water damage, staining, or other physical damage. Comply with manufacturer's recommendations for job site storage, handling and protection.

PROJECT CONDITIONS

Weather Conditions: Proceed with siding installation only when existing and forecasted weather conditions will permit siding to be installed in compliance with manufacturer's recommendations and when substrate is completely dry.

EXTRA MATERIALS

Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.

Furnish quantity of siding equal to 1 percent of amount installed.

WARRANTY

Special Project Warranty: Submit a written warranty, executed by manufacturer, agreeing to repair or replace siding that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to, deformation or deterioration of siding beyond normal weathering. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.

Warranty period is 20 years after date of Substantial Completion.

PART 2 - PRODUCTS

MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering siding which may be incorporated in the Work include, but are not limited to, the following:

Galvalume Siding and Roofing:

Ideal Roofing, Inc., Security Rib, 30 gauge.

ACCESSORIES:

Fasteners: Noncorrosive aluminum or stainless steel siding nails, in sufficient length to penetrate minimum of 1 inch into substrate, with neoprene washer for waterproof application.

PART 3 - EXECUTION

EXAMINATION

Examine substrates for compliance with requirements for substrates, installation tolerances, and other conditions affecting performance of siding. Do not proceed with installation until unsatisfactory conditions have been corrected.

PREPARATION

Clean substrates of projections and substances detrimental to application.

Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

INSTALLATION

Comply with siding manufacturer's installation instructions and recommendations. Install trim and accessories in accordance with manufacturer's recommendations. Overlap butt joints to shed water away from direction of prevailing wind. Isolate dissimilar metals.

ADJUSTING

Replace damaged siding materials with new materials complying specified requirements.

END OF SECTION 07460

SECTION 08314 - WOOD MAN DOORS

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes job-built wood man doors .

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product Data for each type of product specified consisting of manufacturer's technical Product Data and installation instructions for each type of door required, including data substantiating that products comply with requirements.

PART 2 - PRODUCTS

MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

Cannonball Door Co., Inc. (Wickes Lumber)

MATERIALS

Hardware and Fasteners: Manufacturer's standard units.

Where items are used on exterior doors, hot-dip galvanize in compliance with ASTM A 153.

Wood Man Doors:

Wood:	Pressure treated for ground contact.
Fasteners:	Stainless steel screw nails.
Hinges:	Heavy duty tee hinge, galvanized with brass pin and screws, size 8, Stanley SP908BP, or W.W. Grainger 5J169.
Boltlock:	Yale Model 197 or W.W. Grainger 5T722, keyed outside, thumbturn inside.
Latch:	Grainery door latch with "D" handles, latch bolt and strike, handles on interior and exterior.

PART 3 - EXECUTION

INSTALLATION

Fabricate and install wood man doors according to normal procedures for rough carpentry.

ADJUSTING AND CLEANING

Test-operate each installation on completion to ensure satisfactory operation. Check moving parts for proper lubrication and make adjustments for smooth, easy operation.

Clean surfaces and reprime abraded or damaged primed surfaces to match factory-applied finish.

END OF SECTION 08314

SECTION 08361 - SECTIONAL OVERHEAD DOORS

PART 1 - GENERAL

SUMMARY

This Section includes electrically operated sectional overhead doors.

PERFORMANCE REQUIREMENTS

Structural Performance: Provide sectional overhead doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:

Wind Loads: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and outward.

SUBMITTALS

Product Data: For each type and size of sectional overhead door and accessory.

Shop Drawings: For special components and installations not detailed in manufacturer's product data.

QUALITY ASSURANCE

Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Wood Doors with flush Panels:

Amarr Garage Doors.
Fimbel Door Corporation.
Overhead Door Corp.
Wayne-Dalton Corp.

WOOD DOOR SECTIONS

Panel-Type Sections: Stiles and rails of clear, vertical-grain, straight, kiln-dried Douglas fir, West Coast hemlock, or Sitka spruce, not less than 1-3/4 inches (44 mm) thick.

Panel Inserts: Tempered hardboard.

Treat wood door members after machining with water-repellent preservative formulation according to NWWDA I.S. 4.

Factory prime door sections with one coat of exterior primer.

TRACKS, SUPPORTS, AND ACCESSORIES

Tracks: Manufacturer's standard, galvanized steel track system, sized for door size and weight, designed for lift type indicated and clearances shown, including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Weld or bolt to track supports.

Provide tracks configured for the following lift types:

Standard.
Low headroom (at Solon and Waldoboro).

Track Reinforcement and Supports: Galvanized steel supporting members to provide strength and rigidity during opening and closing of doors.

Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of overhead door.

Provide motor-operated doors with combination bottom weatherseal and sensor edge.
Provide continuous flexible seals at door jambs for a weathertight installation.

HARDWARE

General: Provide heavy-duty, corrosion-resistant hardware to suit door type.

Hinges: Heavy-duty galvanized steel hinges at each end stile and at each intermediate stile. Attach hinges to door sections through stiles and rails. Provide double-end hinges where required and for doors exceeding 16 feet (4.87 m) in width.

Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races.

Tire Material: Case-hardened steel.

Push/Pull Handles: Galvanized steel lifting handles on each side of door.

Slide Bolt: Engage through slots in tracks for locking by padlock, operable from inside only.

Chain Lock Keeper: Suitable for padlock.

If door unit is power operated, provide safety interlock switch to disengage power supply when door is locked.

COUNTERBALANCE MECHANISM

Torsion Spring: Fabricated from oil-tempered-steel wire, mounted on a cross-header tube or steel shaft. Connect to door with galvanized aircraft-type lift cables with cable safety factor of at least 5 to 1. Provide springs calibrated for a minimum of 10,000 cycles.

Cable Drums: Cast-aluminum or gray-iron casting cable drums grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft.

Cable Safety Device: Include a spring-loaded, steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either cable breaks.

Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level shaft and prevent sag.

Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

ELECTRIC DOOR OPERATORS

General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycle requirements specified, and accessories required for proper operation.

Disconnect Device: Hand-operated disconnect device for automatically engaging chain-and-sprocket operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount disconnect device and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

Provide control equipment, maximum 24-V, ac or dc.

Door-Operator Type: Unit consisting of electric motor, trolley or drawbar type, and floor-level quick release for manual operation.

Electric Motors: High-starting torque, reversible, continuous-duty, with overload protection, sized to start, accelerate, and operate door in either direction from any position.

Coordinate wiring requirements and electrical characteristics of motors with building electrical system.

Remote-Control Station: Momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."

Obstruction Detection Device: Automatic safety sensor capable of protecting full width of door opening. Activation of sensor immediately stops and reverses downward door travel.

Limit Switches: Adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

PART 3 - EXECUTION

INSTALLATION

General: Install door, track, and operating equipment complete with necessary hardware according to Shop Drawings, manufacturer's written instructions, and as specified.

ADJUSTING

Lubricate bearings and sliding parts; adjust doors to operate easily, free of warp, twist, or distortion and with weathertight fit around entire perimeter.

Touch-up Painting: Immediately after welding galvanized track to track supports, clean field welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780.

END OF SECTION 08361

SECTION 09900 - PAINTING

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes surface preparation and field painting of the following:

Exposed exterior wood trim at doors and non-galvanized ferrous metal at doors.

Exposed interior wood trim at doors and non-galvanized ferrous metal at doors.

Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect/Engineer will select from standard colors and finishes available.

PROJECT CONDITIONS

Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.

Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.

Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

MANUFACTURERS

Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.

Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:

Devoe & Raynolds Co. (Devoe).
Fuller-O'Brien Paints (Fuller).

Glidden Co. (The) (Glidden).
Benjamin Moore & Co. (Moore).
PPG Industries, Inc. (PPG).
Pratt & Lambert, Inc. (P & L).
Sherwin-Williams Co. (S-W).

PART 3 - EXECUTION

EXAMINATION

Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

PREPARATION

General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer.

Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.

Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

Use only thinners approved by paint manufacturer and only within recommended limits.

APPLICATION

General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

Paint colors, surface treatments, and finishes are indicated in the schedules.

Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

Provide finish coats that are compatible with primers used.

Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer.

Omit primer on metal surfaces that have been shop primed and touchup painted.

If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.

Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

Electrical items to be painted include, but are not limited to, the following:

Panelboards.

Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

CLEANING

Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

PROTECTION

Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect/Engineer.

Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

PAINT SCHEDULE

Smooth Wood: Provide the following finish systems over interior and exterior wood surfaces:

Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.

Primer: Exterior, alkyd or latex, wood primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.

Devoe:	1102 All-Weather Exterior Alkyd House Paint Primer.
Fuller:	220-08 Exterior Latex Wood Primer.
Glidden:	UH 450 Ultra-Hide Oil/Alkyd Exterior Primer.
Moore:	Moorwhite Primer #100.
PPG:	72-1 Sun-Proof Exterior House & Trim Wood Primer Flat--Latex.
P & L:	S/D 1002 Suprime "2" Exterior Latex Wood Primer.

First and Second Coats: Semigloss, waterborne, exterior, acrylic enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.

Devoe:	17XX Wonder-Shield Semi-Gloss Exterior Acrylic Latex House and Trim Paint.
Fuller:	664-XX Weather King II Semi-Gloss House & Trim Paint.
Glidden:	6600 Series Spred Ultra Exterior Gloss Latex House & Trim Paint.
Moore:	MoorGlo Latex House & Trim Paint #096.
PPG:	78 Line Sun-Proof Semi-Gloss Acrylic Latex House and Trim Paint.
P & L:	Z/F 3100 Series Aqua Royal Latex House & Trim Finish.

Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.

Semigloss, Acrylic-Enamel Finish: 2 finish coats over a rust-inhibitive primer.

Primer: Rust-inhibitive metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.

Devoe:	13101 Mirrolac Rust Penetrating Metal Primer.
Fuller:	621-04 Blox-Rust Alkyd Metal Primer.
Glidden:	5205 Glid-Guard Tank & Structural Primer, Red.
Moore:	IronClad Retardo Rust-Inhibitive Paint #163.
PPG:	6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer.
P & L:	S/D 1009 Suprime "9" Interior/Exterior Alkyd Metal Primer.

First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.

Devoe:	17XX Wonder-Shield Semi-Gloss Exterior Acrylic Latex House and Trim Paint.
Fuller:	664-XX Weather King II Semi-Gloss House & Trim Paint.
Glidden:	6600 Series Spred Ultra Exterior Gloss Latex House & Trim Paint.
Moore:	MoorGlo Latex House & Trim Paint #096.
PPG:	78 Line Sun-Proof Semi-Gloss Acrylic Latex House and Trim Paint.
P & L:	Z/F 3100 Series Aqua Royal Latex House & Trim Finish.

END OF SECTION 09900

SECTION 15852 - AXIAL FANS

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes the following:

Propeller fans.

Related Sections: The following Sections contain requirements that relate to this Section:

Division 16 Section "Disconnects Switches" for disconnect switches.

PERFORMANCE REQUIREMENTS

Fan Unit Schedule: The following information is described in an equipment schedule on the Drawings.

Fan performance data including capacities, static pressures, motor requirements, and electrical characteristics.

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product Data including rated capacities of each unit, weights (shipping, installed, and operating), furnished specialties, accessories, and the following:

Motor ratings and electrical characteristics plus motor and electrical accessories.

Material gages and finishes, including color charts.

Dampers, including housings, linkages, and operators.

Shop Drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.

Wiring diagrams detailing wiring for power and control systems and differentiating clearly between manufacturer-installed and field-installed wiring.

QUALITY ASSURANCE

Electrical Component Standard: Provide components that comply with NFPA 70 and that are listed and labeled by UL where available.

Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.

The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

AMCA Compliance: Provide products that meet performance requirements and are licensed to use the AMCA Seal.

NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.

DELIVERY, STORAGE, AND HANDLING

Deliver fans as factory-assembled units, to the extent allowable by shipping limitations, with protective crating and covering.

Lift and support units with the manufacturer's designated lifting or supporting points.

PROJECT CONDITIONS

Field Measurements: Verify dimensions by field measurements. Verify clearances.

Do not operate fans until bearings are lubricated, and fans have been commissioned.

EXTRA MATERIALS

Furnish one set of belts for each belt-driven fan that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.

PART 2 - PRODUCTS

MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

Propeller Fans:

Acme Engineering & Mfg. Corp.
Aerovent, Inc.
Airmaster Fan Co.
American Coolair Corp.
Buffalo Forge Co.

Carnes Co.
Cook (Loren) Co.
Dayton Model 6D579; 18,000 cfm at Free Air, 1hp, 1 Phase Motor
Dayton Model 7CH09; 18,000 cfm of Free Air, 1hp, 1 Phase Motor
Greenheck Fan Corp.
Hartzell Fan, Inc.
ILG Industries, Inc.
Jenn Industries Inc.
Penn Ventilator Co., Inc.

PROPELLER FANS

Description: Belt-driven or direct-drive propeller fans, as indicated, consisting of fan blades, hub, housing, orifice ring, motor, drive, and accessories.

Housings: Galvanized steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat after assembly.

Steel Fan Wheels: Formed-steel blades riveted to heavy-gage steel spider bolted to cast-iron hub.

Belt-Driven Drive Assembly: Resiliently mounted to the housing, statically and dynamically balanced and selected for continuous operation at the maximum rated fan speed and motor horsepower (HP), with final alignment and belt adjustment made after installation.

Service Factor Based on Fan Motor: 1.4.

Fan Shaft: Turned, ground, and polished steel keyed to wheel hub.

Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.

Ball-Bearing Rated Life: AFBMA 9, L-10 of 100,000 hours.

Pulleys: Cast iron with split, tapered bushing, dynamically balanced at factory.

Motor Pulleys: Adjustable pitch for use with motors through 5 HP; fixed pitch for use with motors larger than 5 HP. Select pulley so pitch adjustment is at the middle of the adjustment range at fan design conditions.

Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.

Belt Guards: Fabricate of steel for motors mounted on the outside of the fan cabinet.

Accessories: The following accessories are required as indicated:

Gravity Shutters: Aluminum blades in aluminum frame, interlocked blades with nylon bearings.

Motor-Side Back Guard: Galvanized steel, conforming to OSHA specifications, removable for maintenance.

Wall Sleeve: Galvanized steel to match fan and accessory size.

Weathershield Hood: Galvanized steel to match fan and accessory size.

Weathershield Front Guard: Galvanized steel with expanded metal screen.

Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

MOTORS

Motor Construction: NEMA MG 1, general purpose, continuous duty, Design B.

Enclosure Type: The following features are required as indicated:

Open dripproof motors where satisfactorily housed or remotely located during operation.

FACTORY FINISHES

Sheet Metal Parts: Prime coat before final assembly.

SOURCE QUALITY CONTROL

Testing Requirements: The following factory tests are required as indicated:

Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

EXAMINATION

Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the fans. Do not proceed with installation until unsatisfactory conditions have been corrected.

INSTALLATION

Install fans according to manufacturer's written instructions.

Suspend units from structure using threaded steel rods and vibration isolation springs.

Install units with clearances for service and maintenance.

CONNECTIONS

Electrical: Conform to applicable requirements in Division 16 Sections.

Grounding: Ground equipment. Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

ADJUSTING

Adjust damper linkages for proper damper operation.

Adjust belt tension.

Lubricate bearings.

CLEANING

After completing installation, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.

COMMISSIONING

Final Checks before Startup: Perform the following operations and checks before startup:

Verify that shipping, blocking, and bracing are removed.

Verify that unit is secure on mountings and supporting devices and that connections for electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnects.

Perform cleaning and adjusting specified in this Section.

Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearings operation. Reconnect fan drive system, align and adjust belts, and install belt guards.

Verify lubrication for bearings and other moving parts.

Starting procedures for fans are as follows:

Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated RPM.

Measure and record motor voltage and amperage.

DEMONSTRATION

Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.

END OF SECTION 15852

SECTION 16120 - WIRES AND CABLES

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes building wires and cables and associated splices, connectors, and terminations for wiring systems rated 600 volts and less.

QUALITY ASSURANCE

Comply with NFPA 70 "National Electrical Code" for components and installation.

Listing and Labeling: Provide products specified in this Section that are listed and labeled.

The Terms "Listed and Labeled": As defined in the "National Electrical Code," Article 100.

SEQUENCING AND SCHEDULING

Coordination: Coordinate layout and installation of cable with other installations.

Revise locations and elevations from those indicated as required to suit field conditions and as approved by the Architect.

DELIVERY, STORAGE, AND HANDLING

Deliver wire and cable according to NEMA WC-26.

PART 2 - PRODUCTS

MANUFACTURERS

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Wires and Cables:

American Insulated Wire Corporation, Leviton Manufacturing Co.
Brand-Rex Cable Systems, Brintec Corp.
Carol Cable Company, Inc.
Senator Wire & Cable Co.

Southwire Co.

Connectors for Wires and Cables:

AFC, Monogram Co.
AMP, Inc.
Anderson, Square D Co.
Electrical Products Division, 3M Co.
O-Z/Gedney Unit, General Signal.

BUILDING WIRES AND CABLES

UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Applications" Article.

Thermoplastic Insulation: Conform to NEMA WC 5.

Solid conductor for 10 AWG and smaller; stranded conductor for larger than 10 AWG.

CONNECTORS AND SPLICES

UL-listed factory-fabricated wiring connectors of size, ampacity rating, material, and type and class for application and for service indicated. Select to comply with Project's installation requirements and as specified in Part 3 "Applications" Article.

PART 3 - EXECUTION

EXAMINATION

Examine building finishes to receive wires and cables for compliance with installation tolerances and other conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

APPLICATIONS

Service Entrance: Type USE-AL, aluminum conductor, in raceway.

Branch Circuits: Type THHN/THWN, copper conductor, in raceway.

INSTALLATION

Install wires and cables as indicated, according to manufacturer's written instructions and the NECA "Standard of Installation."

Pull conductors into raceway simultaneously where more than one is being installed in same raceway.

Use pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation.

Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

Conductor Splices: Keep to minimum.

Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.

Use splice and tap connectors that are compatible with conductor material.

Wiring at Outlets: Install with at least 12 inches (300 mm) of slack conductor at each outlet.

Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts, according to equipment manufacturer's published torque-tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals according to tightening torques specified in UL Standard 486A.

FIELD QUALITY CONTROL

Testing: Upon installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA Standard ATS, Section 7.3.1. Certify compliance with test parameters.

Correct malfunctioning products at site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.

END OF SECTION 16120

SECTION 16452 - GROUNDING

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes grounding of electrical systems and equipment and basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.

Related Sections: The following Sections contain requirements that relate to this Section:

Division 16 Section "Wires and Cables" for requirements for grounding conductors.

QUALITY ASSURANCE

Comply with NFPA 70.

Comply with UL 467.

Listing and Labeling: Provide products specified in this Section that are listed and labeled.

The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

PART 2 - PRODUCTS

MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Apache Grounding; Nashville Wire Products.
Boggs: H. L. Boggs & Co.
Chance: A. B. Chance Co.
Dossert Corp.
Erico Inc.; Electrical Products Group.
Galvan Industries, Inc.
Hastings Fiber Glass Products, Inc.
Heary Brothers Lightning Protection Co.
Ideal Industries, Inc.
ILSCO.
Kearney.
Korns: C. C. Korns Co.
Lightning Master Corp.
Lyncole XIT Grounding.
O-Z/Gedney Co.
Raco, Inc.

Salisbury: W.H. Salisbury & Co., Utility.
Thomas & Betts, Electrical.
Utilco Co.

GROUNDING AND BONDING PRODUCTS

Governing Requirements: Where types, sizes, ratings, and quantities indicated are in excess of National Electrical Code (NEC) requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

WIRE AND CABLE GROUNDING CONDUCTORS

Comply with Division 16 Section "Wires and Cables." Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.

Equipment Grounding Conductors: Insulated with green color insulation.

Grounding-Electrode Conductors: Stranded cable.

Underground Conductors: Bare, tinned, stranded, except as otherwise indicated.

Bare Copper Conductors: Conform to the following:

Solid Conductors: ASTM B 3.

Assembly of Stranded Conductors: ASTM B 8.

Tinned Conductors: ASTM B 33.

MISCELLANEOUS CONDUCTORS

Braided Bonding Jumpers: Copper tape, braided No. 30 AWG bare copper wire, terminated with copper ferrules.

Bonding Straps: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

CONNECTOR PRODUCTS

Pressure Connectors: High-conductivity-plated units.

Bolted Clamps: Heavy-duty type.

GROUNDING ELECTRODES AND TEST WELLS

Grounding Rods: Copper-clad steel.

Size: 5/8 inch by 96 inches.

Test Wells: Fabricate from 15-inch-long, square-cut sections of 8-inch-diameter, Schedule 80, PVC pipe.

PART 3 - EXECUTION

APPLICATION

Equipment Grounding Conductors: Comply with NEC Article 250 for types, sizes, and quantities of equipment grounding conductors, except where specific types, larger sizes, or more conductors than required by NEC are indicated.

Install equipment grounding conductor with circuit conductors for the items below in addition to those required by Code:

Feeders and branch circuits.

Lighting circuits.

Receptacle circuits.

Three-phase motor or appliance branch circuits.

Flexible raceway runs.

Armored and metal-clad cable runs.

Busway Supply Circuits: Install separate equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding-bar terminal on busway.

Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

INSTALLATION

General: Ground electrical systems and equipment according to NEC requirements, except where Drawings or Specifications exceed NEC requirements.

Grounding Rods: Locate a minimum of 1-rod length from each other and at least the same distance from any other grounding electrode.

Drive until tops are 2 inches below final grade, except as otherwise indicated.

Interconnect with grounding-electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make these connections without damaging copper coating or exposing steel.

Grounding Conductors: Route along the shortest and straightest paths possible, except as otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

Underground Grounding Conductors: Use bare copper wire. Bury at least 24 inches below grade.

CONNECTIONS

General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.

Make connections with clean, bare metal at points of contact.

Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

Equipment Grounding-Wire Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

Noncontact Metal Raceway Terminations: Where metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors, except as otherwise indicated.

Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Where these requirements are not available, use those specified in UL 486A and UL 486B.

Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by manufacturer of connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

Moisture Protection: Where insulated grounding conductors are connected to grounding rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

FIELD QUALITY CONTROL

Tests: Subject the completed grounding system to a megger test at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than 2 full days after the last trace of precipitation, and without the 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. Perform tests by the 2-point method according to IEEE 81.

Maximum grounding to resistance values are as follows:

Equipment Rated 500 kVA and Less: 10 ohms.

Excessive Ground Resistance: Where resistance to ground exceeds specified values, notify Owner promptly and include recommendations to reduce ground resistance and to accomplish recommended work.

Report: Prepare test reports of ground resistance at each test location. Include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

END OF SECTION 16452

SECTION 16470 - PANELBOARDS

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes lighting and power panelboards and associated auxiliary equipment rated 600 V and less.

Set new 100 amp 2-pole circuit breakers switch in existing garage for feeders to the panelboard in the sand/salt building.

SUBMITTALS

Product Data: For each type of panelboard, accessory item, and component specified.

Shop Drawings: For panelboards. Include dimensioned plans, sections, and elevations. Show tabulations of installed devices, major features, and voltage rating. Include the following:

Enclosure type with details for types other than NEMA 250, Type 3R.

Bus configuration and current ratings.

Short-circuit current rating of panelboard.

Features, characteristics, ratings, and factory settings of individual protective devices and auxiliary components.

Wiring Diagrams: Details of schematic diagram including control wiring and differentiating between manufacturer-installed and field-installed wiring.

Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

Maintenance Data: For panelboard components to include in the maintenance manuals specified in Division 1. Include manufacturer's written instructions for testing circuit breakers.

QUALITY ASSURANCE

Listing and Labeling: Provide products specified in this Section that are listed and labeled.

The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

Comply with NFPA 70.

Comply with NEMA PB 1.

PART 2 - PRODUCTS

MANUFACTURERS

Manufacturers: Subject to compliance with requirements, provide products by the following:

American Circuit Breaker Corp.
Eaton Corp.; Westinghouse & Cutler-Hammer Products.
General Electric Co.; Electrical Distribution & Control Div.
Siemens Energy & Automation, Inc.
Square D Co.

PANELBOARD FABRICATION

Enclosures: Surface-mounted cabinets NEMA 250, Type 3R.

Front: Secured to box with concealed trim clamps, unless otherwise indicated. Front for surface-mounted panelboards shall be same dimensions as box.

Directory Frame: Metal, mounted inside each panelboard door.

Bus: Hard drawn copper of 98 percent conductivity.

Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors. Bonded to box.

Service Equipment Approval: Listed for use as service equipment for panelboards with main service disconnect.

Future Devices: Equip with mounting brackets, bus connections, and necessary appurtenances, for the overcurrent protective device ampere ratings indicated for future installation of devices.

Overcurrent Protective Devices: Plug-in, full-module circuit breaker.

Circuit Breakers for Switching Lights at Panelboards: Type SWD.

Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

PART 3 - EXECUTION

INSTALLATION

Install panelboards and accessory items according to NEMA PB 1.1.

Mounting Heights: Top of trim 74 inches above grade, unless otherwise indicated.

Mounting: Plumb and rigid without distortion of box on exterior of building.

Circuit Directory: Type directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing.

Install filler plates in unused spaces.

Wiring in Panelboard Gutters: Arrange conductors into groups, and bundle and wrap with wire ties after completing load balancing.

CONNECTIONS

Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

FIELD QUALITY CONTROL

Prepare for acceptance tests as follows:

Make insulation-resistance tests of each panelboard bus, component, and connecting supply, feeder, and control circuits.

Make continuity tests of each circuit.

Testing: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.

Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.

CLEANING

On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

END OF SECTION 16470

SECTION 16476 - DISCONNECT SWITCHES

PART 1 - GENERAL

SUMMARY

This Section includes individually mounted switches used for the following:

Motor disconnect switches.

Service disconnect switch at exterior of existing garage.

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product Data for disconnect switches, and accessories specified in this Section.

QUALITY ASSURANCE

Source Limitations: Obtain disconnect switches from one source and by a single manufacturer.

Comply with NFPA 70 for components and installation.

Listing and Labeling: Provide disconnect switches specified in this Section that are listed and labeled.

The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

PART 2 - PRODUCTS

DISCONNECT SWITCHES

Enclosure: NEMA Type 1, exposed with wrap-around cover.

PART 3 - EXECUTION

INSTALLATION

Install disconnect switches in locations as indicated, according to manufacturer's written instructions.

Install disconnect switches level and plumb.

Connect disconnect switches and components to wiring system and to ground as indicated and instructed by manufacturer.

Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

Identify each disconnect switch according to requirements specified in Division 16 Section "Basic Electrical Materials and Methods."

FIELD QUALITY CONTROL

Testing: After installing disconnect switches and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.5 for disconnect switches. Certify compliance with test parameters.

Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

CLEANING

After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

END OF SECTION 16476

SECTION 16515 - LIGHTING

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes interior lighting fixtures, exterior building-mounting lighting fixtures, lamps, ballasts, and accessories.

DEFINITIONS

Fixture: A complete lighting unit, exit sign, or emergency lighting unit. Fixtures include lamps and parts required to distribute light, position and protect lamps, and connect lamps to power supply.

Average Life: The time after which 50 percent fails and 50 percent survives under normal conditions.

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product Data describing fixtures, lamps, ballasts, and emergency lighting units. Arrange Product Data for fixtures in order of fixture designation. Include data on features and accessories and the following:

Outline drawings indicating dimensions and principal features of fixtures.

Maintenance data for fixtures to include in the operation and maintenance manual specified in Division 1.

QUALITY ASSURANCE

Electrical Component Standard: Provide components that comply with NFPA 70 and that are listed and labeled by UL where available.

Listing and Labeling: Provide fixtures, emergency lighting units, and accessory components specified in this Section that are listed and labeled for their indicated use and installation conditions on Project.

The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

Coordinate fixtures, mounting hardware, and trim with ceiling system and other items, including work of other trades, required to be mounted on ceiling or in ceiling space.

PART 2 - PRODUCTS

MANUFACTURERS

Products: Subject to compliance with requirements, provide one of the products specified in each Lighting Fixture Schedule at end of this Section.

FIXTURES AND FIXTURE COMPONENTS, GENERAL

Metal Parts: Free from burrs, sharp corners, and edges.

Sheet Metal Components: Steel, except as indicated. Form and support to prevent warping and sagging.

Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.

Reflecting Surfaces: Minimum reflectance as follows, except as otherwise indicated:

White Surfaces: 85 percent.

Specular Surfaces: 83 percent.

Diffusing Specular Surfaces: 75 percent.

Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or water white, annealed crystal glass, except as otherwise indicated.

Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

Lens Thickness: 0.125 inch minimum.

Fixture Support Components: Comply with Division 16 Section "Basic Electrical Materials and Methods."

Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

Hook Hanger: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

High-Intensity-Discharge (HID) Fixtures: Conform to UL 1572.

HID Ballasts: Conform to UL 1029 and ANSI C82.4. Include the following features, except as otherwise indicated.

Constant wattage autotransformer (CWA) or regulating high-power-factor type, unless otherwise indicated.

Operating Voltage: Match system voltage.

Single-Lamp Ballasts: Minimum starting temperature of minus 30 deg C.

Normal Ambient Operating Temperature: 40 deg C.

Open circuit operation will not reduce average life.

High-Pressure Sodium (HPS) Ballasts: Equip with a solid-state igniter/starter having an average life in pulsing mode of 10,000 hours at an igniter/starter case temperature of 90 deg C.

Encapsulation: Manufacturer's standard epoxy-encapsulated model designed to minimize audible fixture noise.

Auxiliary, Instant-On, Quartz System: Automatically switches quartz lamp when fixture is initially energized and when momentary power outages occur. Turns quartz lamp off automatically when HID lamp reaches approximately 60 percent light output.

Incandescent Fixtures: Conform to UL 1571.

FINISHES

Manufacturer's standard, except as otherwise indicated, applied over corrosion-resistant treatment or primer, free of streaks, runs, holidays, stains, blisters, and similar defects.

PART 3 - EXECUTION

INSTALLATION

Support for Suspended Fixtures: Brace pendants and rods over 48 inches long to limit swinging.

Lamping: Where specific lamp designations are not indicated, lamp units according to manufacturer's instructions.

CONNECTIONS

Ground lighting units. Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

FIELD QUALITY CONTROL

Inspect each installed fixture for damage. Replaced damaged fixtures and components.

Provide instruments to make and record test results.

Tests: Verify normal operation of each fixture after fixtures have been installed and circuits have been energized with normal power source.

Replace or repair malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.

Report results of tests.

Replace fixtures that show evidence of corrosion during Project warranty period.

ADJUSTING AND CLEANING

Clean fixtures after installation. Use methods and materials recommended by manufacturer.

Adjust aimable fixtures to provide required light intensities.

LIGHTING FIXTURE SCHEDULE

Fixture Type A: High Pressure Sodium Crouse Hinds Flexoliner II, SFC25-MT-H2, 250 watt high pressure sodium with hook and lamp, or Day-Brite HB Day-Line HB25HS-MT-S16, 250 watt high pressure sodium with hook and lamp.

Fixture Type B: Incandescent Tungsten Halogen Hubbell Quartzliter QL Series QL-505 with 300 watt T-3 tungsten halogen lamp.

Fixture Type C: Building Mounted HPS Floorlight General Electric PF4S40S0A26x6DB-MV, 400 watt high pressure sodium with lamp, photo-electric cell and mounting trunnion.

END OF SECTION 16515