66 INDUSTRIAL DRIVE
PHASE 2

20118.20

AUGUSTA

2014

Volume 1 of 4

Updated **1/19/12**

STATE PROJECT

BIDDING INSTRUCTIONS

FOR ALL PROJECTS:

1. Use pen and ink to complete all paper Bids.
2. As a minimum, the following must be received prior to the time of Bid opening:

For a Paper Bid:

a) a copy of the Notice to Contractors, b) the completed Acknowledgement of Bid Amendments form, c) two copies of the completed and signed Contract Offer, Agreement & Award form, d) a Bid Guaranty, (if required), e) the completed Contractor Information Sheet, and f) any other certifications or Bid requirements listed in the Bid Documents as due by Bid opening.

For an Electronic Bid:

a) a completed Bid using Expedite® software and submitted via the Bid Express™ web-based service, b) an electronic Bid Guaranty (if required) or a faxed copy of a Bid Bond (with original to be delivered within 72 hours), and c) any other Certifications or Bid requirements listed in the Bid Documents as due by Bid opening.

3. Include prices for all items in the Schedule of Items (excluding non-selected alternates).
4. Bid Guaranty acceptable forms are:
   a) a properly completed and signed Bid Bond on the Department's prescribed form (or on a form that does not contain any significant variations from the Department's form as determined by the Department) for 5% of the Bid Amount or
   b) an 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 or
   c) an electronic bid bond submitted with an electronic bid.

5. If a paper Bid is to be sent, "FedEx First Overnight" delivery is suggested as the package is delivered directly to the DOT Headquarters Building located at 24 Child Street in Augusta. Other means, such as U.S. Postal Service's Express Mail has proven not to be reliable.

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

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

January 19, 2012
Supersedes September 09, 2011

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 an optional 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 or David Venner 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 contact Patrick Corum at patrick.corum@maine.gov , Rebecca Snowden at rebecca.snowden@maine.gov or Diane Barnes at diane.barnes@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:

October 16, 2001

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. Questions are to be faxed to the number listed in the Notice to Contractors or submitted to the Department at the pre-bid meeting. Bidders may attach separate sheets with questions to the "Request for Information" form. This is the only allowable mechanism for answering Project specific questions. Maine DOT will not be bound to any answers to Project specific questions received during the Bidding phase through other processes.

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: _____

Vendor Registration

Prospective Bidders must register as a vendor with the Department of Administrative & Financial Services if the vendor is awarded a contract. Vendors will not be able to receive payment without first being registered. Vendors/Contractors will find information and register through the following link –
http://www.maine.gov/purchases/venbid/index.shtml

CONTRACTOR INFORMATION

Contractor Name: _____

Mailing Address: _____

Vendor Customer Number: _____

Contact Information (Primary Contact): _____

Phone: _____ **Cell Phone:** _____

Fax: _____

Email: _____

Mailing Address (if different from above): _____

_____

The company has the following organizational structure:

☐ **Sole Proprietorship** ☐ **Limited Liability Company**

☐ **Partnership** ☐ **Joint Venture**

☐ **Corporation** ☐ **Other:** _____

_____ _____

(Date) **(Signature)**

_____

(Name and Title Printed)

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 "Bids for **66 Industrial Drive Phase 2** in the city of **AUGUSTA**" will be received from contractors at the Reception Desk, Maine DOT Building, Capitol Street, Augusta, Maine, until 11:00 o'clock A.M. (prevailing time) on April 2, 2014 and at that time and place publicly opened and read. Bids will be accepted from all bidders. The lowest responsive bidder must have completed, or successfully complete, a Building, or project specific prequalification to be considered for the award of this contract. **We now 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. Until further notice, dual bids (one paper, one electronic) will be accepted, with the paper copy taking precedence.**

Description: WIN 020118.20

Location: In Kennebec County, project is located at 66 Industrial Drive.

Outline of Work: Building and other incidental work.

A mandatory pre-bid meeting is scheduled for Wednesday, March 19, 2014 at the site located at 66 Industrial Drive, Augusta, Maine starting at 10:00 A.M.

For general information regarding Bidding and Contracting procedures, contact George Macdougall at (207) 624-3410. Our webpage at http://www.maine.gov/mdot/contractors/ 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 **Valerie Chiang** at (207) 624-3431. Questions received after 12:00 noon of **Friday** 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. TTY users call Maine Relay 711.

Plans, specifications and bid forms may be seen at the Maine DOT Building in Augusta, Maine and at the Department of Transportation's Regional Office in Augusta. 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 $120.00 ($128.00 by mail). Half size plans $60.00 ($20.00 by mail), Bid Book $10 ($13 by mail), Single Sheets $2, 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 $250,000 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 State 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]. They also may be purchased by telephone at (207) 624-3536 between the hours of 8:00 a.m. to 4:30 p.m. Standard Detail updates can be found at http://www.maine.gov/mdot/contractors/publications/ .

The right is hereby reserved to the Maine DOT to reject any or all bids.

Augusta, Maine
March 12, 2014

STATE OF MAINE
Joyce Noel Taylor
6997
LICENSED
PROFESSIONAL ENGINEER

Joyce Noel Taylor

JOYCE NOEL TAYLOR P. E.
CHIEF ENGINEER

Augusta
20118.20
66 Industrial Drive, Phase 2
April 14, 2011
Supersedes August 3, 2004

SPECIAL PROVISION 102.7.3
ACKNOWLEDGMENT OF BID AMENDMENTS

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/contractors/ . 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)

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 020118.20 Project(s): 020118.20

SECTION: 1 PROJECT ITEMS

Alt Set ID: Alt Mbr ID:

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0010	815.00 BUILDING 66 INDUSTRIAL DRIVE	LUMP SUM	LUMP SUM	_____._____
	Section: 1		Total:	_____._____
			Total Bid:	_____._____

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 or MaineDOT), 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 _____ **(Contractor)** a corporation or other legal entity organized under the laws of the State of _____, 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, **WIN 20118.20**, for the **Construction of 66 Industrial Drive - Phase 2, Building Renovation, Addition, Construction and Demolition** in the **City of Augusta**, County of **Kennebec,** State of 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 **October 1, 2014.** 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 and related Special Provisions.

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 _____

_____

$_____ 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 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, 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 **WIN 20118.20**, for the **Construction of 66 Industrial Drive - Phase 2** in the **City of Augusta**, County of **Kennebec,** 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 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 Bernhardt, 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 or MaineDOT), 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 _____ **(Contractor)** a corporation or other legal entity organized under the laws of the State of _____, 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, **WIN 20118.20**, for the **Construction of 66 Industrial Drive - Phase 2, Building Renovation, Addition, Construction and Demolition** in the **City of Augusta**, County of **Kennebec,** State of 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 **October 1, 2014.** 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 and related Special Provisions.

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 _____

_____

$_____ 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 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, 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 **WIN 20118.20**, for the **Construction of 66 Industrial Drive - Phase 2** in the **City of Augusta**, County of **Kennebec,** 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 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 Bernhardt, 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 **South Nowhere,** 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, 2006.** 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 and related Special Provisions.

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.

SAMPLE

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, Supplemental Specifications, Special Provisions, Contract Agreement; and Contract Bonds contained herein for construction of:

PIN 1234.00 South Nowhere, 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 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 with their bid.

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 Bernhardt, Commissioner

_____
(Witness)

BOND # _____

CONTRACT PERFORMANCE BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ **in the State of** _____, 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 _____ **and 00/100 Dollars ($)**, 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 Contract to construct Project Number _____ in the Municipality of _____ promptly and faithfully performs 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:
	CONTRACTOR:
Signature.....	.....….....
Print Name Legibly	Print Name Legibly ...….....
	SURETY:
Signature	....….....
Print Name Legibly	Print Name Legibly .....
SURETY ADDRESS:	NAME OF LOCAL AGENCY:
.....	ADDRESS .....
.....	...…….....
.....	.....…….....
TELEPHONE.....	.....…….....

SAMPLE

BOND # _____

CONTRACT PAYMENT BOND
(Surety Company Form)

KNOW ALL MEN BY THESE PRESENTS: That _____ _____ **in the State of** _____, as principal, and.....….....
a corporation duly organized under the laws of the State of ..... and having a usual place of business in .....……., 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 _____ **and 00/100 Dollars ($)** 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 Contract to construct Project Number _____ in the Municipality of _____ promptly satisfies 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 fully reimburses 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 ... .

WITNESS:	SIGNATURES:
	CONTRACTOR:
Signature…….....	.....….....
Print Name Legibly .....……..	Print Name Legibly ….....
	SURETY:
Signature.....	...….....
Print Name Legibly	Print Name Legibly ….....
SURETY ADDRESS:	NAME OF LOCAL AGENCY:
...….....	ADDRESS ….....
.....	…….....
TELEPHONE	…….....

SAMPLE

SPECIAL PROVISION
SECTION 102
BIDDING
(Mandatory Pre-Bid Meeting)

A mandatory pre-bid meeting will be held at 66 Industrial Drive at the time stated in the Notice to Contractors. Only Contractors that attend the meeting will be allowed to bid.

Bidders shall direct all technical or engineering questions, including requests for explanations or interpretation, in writing to the Bid Contact Person noted in the Notice to Contractors using the "Request for Information" form. Questions are to be faxed to the number listed in the Notice to Contractors or submitted to the Department at the pre-bid meeting. Bidders may attach separate sheets with questions to the "Request for Information" form.

The Department is not bound by any other oral or written representations, including information exchanged verbally at pre-Bid meetings. The Department will issue written Bid Amendment in response to questions from Bidders when the answers: (A) relate to ambiguous, incorrect, or missing information in the Bid Documents; (B) are not apparent to Contractors experienced in the type of Work covered by the potential Contract; and (C) could have a significant impact on the cost, quality, conformity or timeliness of the Work.

SPECIAL PROVISION
SECTION 103
AWARD AND CONTRACTING
(Post-Bid Qualifications)

Contractors, not already prequalified, must successfully complete, a Building, or project specific prequalification to be awarded this Contract. Prequalification applications will be accepted from the Apparent Successful Bidder up to seven days after the Department notifies the Apparent Successful Bidder of the requirement for post-bid qualifications. If a current copy of the Contractor's Safety Plan is not on file with the Contracts Section of the Department, the Contractor must submit an acceptable, project specific Safety Plan to the Department.

As a condition for Award of the Contract, the lowest responsive bidder may be required to demonstrate successful and acceptable completion of projects of similar size and scope to be considered for the award of this contract. This requirement includes written documentation of the experience of the firm and/or subcontractor who will be performing the construction specified in the contract documents, a list of recent experience in similar construction projects, including a) the name of the owner for whom the work was performed, b) the name and telephone number of a contact person, c) a description of the work performed, and d) the total construction cost of each project. Said experience shall include, as a minimum, at least one (1) project of equal or greater complexity as the work required by this Contract completed in the last (5) years. A statement of the bidder's qualifications that includes the personnel and equipment available for the work, shall be included.

The Department will notify the Apparent Successful Bidder of the requirement for post-bid qualifications and the Bidder must provide all of the items within seven days of the notice. Upon receipt of the bid qualifications, the Department will determine if the available evidence or information satisfies the Department that the bidder is qualified to properly carry out the terms of the Contract.

March 14, 2007
Supersedes March 3, 1966

Non-federal Projects Only

NOTICE TO CONTRACTORS - PREFERRED EMPLOYEES

Sec. 1303. Public Works; minimum wage

In the employment of laborers in the construction of public works, including state highways, by the State or by persons contracting for the construction, preference must first be given to citizens of the State who are qualified to perform the work to which the employment relates and, if they can not be obtained in sufficient numbers, then to citizens of the United States. Every contract for public works construction must contain a provision for employing citizens of this State or the United States. The hourly wage and benefit rate paid to laborers employed in the construction of public works, including state highways, may not be less than the fair minimum rate as determined in accordance with section 1308. Any contractor who knowingly and willfully violates this section is subject to a fine of not less than $250 per employee violation. Each day that any contractor employs a laborer at less than the wage and benefit minimum stipulated in this section constitutes a separate violation of this section. [1997, c. 757, §1 (amd).]

SPECIAL PROVISIONS

SPECIAL PROVISION SECTION 104
GENERAL RIGHTS AND RESPONSIBILITIES

104.3.8A. Federal Wage Rates and Labor Laws Delete the entire section 104.3.8A.

104.3.8B State Wage Rates and Labor Laws The State wage rates enclosed apply to this project.

THIS DOCUMENT MUST BE CLEARLY POSTED AT THE PERTAINING STATE FUNDED PREVAILING WAGE CONSTRUCTION SITE

State of Maine
Department of Labor
Bureau of Labor Standards
Wage and Hour Division
Augusta, Maine 04333-0045
Telephone (207) 623-7906

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 -------66 Industrial Drive Phase 2 Renovations, Demolition, Additions and Construction of New Buildings

Location of Project –Augusta, Kennebec County

2014 Fair Minimum Wage Rates
Building 2 Kennebec County
(other than 1 or 2 family homes)

Occupation Title	Minimum Wage	Minimum Benefit	Total	Occupation Title	Minimum Wage	Minimum Benefit	Total
Asbestos/Lead Removal Worker	$12.00	$0.38	$12.38	Ironworker - Structural	$23.29	$5.79	$29.08
Backhoe Loader Operator	$18.00	$2.43	$20.43	Laborers (Incl.Helpers & Tenders)	$12.00	$0.25	$12.25
Boom Truck (Truck Crane) Operator	$26.50	$15.46	$41.96	Laborer - Skilled	$16.75	$3.05	$19.80
Bricklayer	$24.27	$3.18	$27.45	Loader Operator - Front-End	$17.88	$3.12	$21.00
Bulldozer Operator	$17.98	$2.55	$20.53	Mechanic- Maintenance	$21.00	$1.05	$22.05
Carpenter	$18.00	$1.95	$19.95	Mechanic- Refrigeration	$22.94	$3.84	$26.78
Carpenter - Acoustical	$13.75	$3.24	$16.99	Millwright	$25.58	$17.85	$43.43
Carpenter - Rough	$15.35	$1.68	$17.03	Oil/Fuel Burner Servicer & Installer (Licensed)	$21.86	$5.45	$27.31
Cement Mason/Finisher	$18.00	$0.47	$18.47	Painter	$13.50	$0.00	$13.50
Communication Equip Installer	$22.00	$3.81	$25.81	Paver Operator	$17.25	$1.63	$18.88
Concrete Pump Operator	$20.50	$3.53	$24.03	Pipe/Steam/Sprinkler Fitter	$25.00	$13.84	$38.84
Crane Operator <15 Tons	$19.50	$4.66	$24.16	Plumber (Licensed)	$25.15	$3.68	$28.83
Crane Operator =>15 Tons)	$23.00	$5.01	$28.01	Plumber Helper/Trainee (Licensed)	$18.03	$2.57	$20.60
Crusher Plant Operator	$17.00	$4.06	$21.06	Propane & Natural Gas Servicer & Inst	$23.00	$3.44	$26.44
Driller - Well	$14.00	$3.20	$17.20	Pump Installer	$21.00	$2.77	$23.77
Dry-Wall Applicator	$20.00	$0.96	$20.96	Rigger	$20.00	$5.83	$25.83
Dry-Wall Taper & Finisher	$19.00	$0.96	$19.96	Roller Operator - Pavement	$17.25	$5.41	$22.66
Electrician - Licensed	$25.57	$7.75	$33.32	Roofer	$15.00	$1.98	$16.98
Electrician Helper/Cable Puller (Licensed)	$15.00	$2.30	$17.30	Sheet Metal Worker	$16.50	$4.49	$20.99
Elevator Constructor/Installer	$51.42	$31.09	$82.51	Sider	$16.00	$1.11	$17.11
Excavator Operator	$19.00	$2.00	$21.00	Stone Mason	$20.00	$0.77	$20.77
Flagger	$11.50	$0.00	$11.50	Tile Setter	$22.05	$3.73	$25.78
Floor Layer	$15.70	$1.96	$17.66	Truck Driver - Light	$16.00	$4.13	$20.13
Glazier	$23.00	$2.67	$25.67	Truck Driver - Medium	$15.00	$1.30	$16.30
HVAC	$20.32	$5.10	$25.42	Truck Driver - Heavy	$14.50	$0.51	$15.01
Insulation Installer	$19.00	$3.24	$22.24	Truck Driver - Tractor Trailer	$16.00	$4.21	$20.21
Ironworker - Reinforcing	$20.88	$1.00	$21.88	Truck Driver - Mixer (Cement)	$13.28	$0.84	$14.12

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: B2-037-2014

Filing Date: February 27, 2014

Expiration Date: 12-31-2014

A true copy

Attest: Pamela Taylor

Pamela Taylor
Director
Bureau of Labor Standards

BLS 424BU (R2014) (Building 2 Kennebec)

Augusta
20118.20
66 Industrial Drive, Phase 2
March 4, 2014

SPECIAL PROVISION
Section 104
GENERAL RIGHTS AND RESPONSIBILITIES
(Cooperation between Contractors)

General

A Phase 1 contract will be awarded and under construction for work as described elsewhere in these documents. The Contractor shall cooperate with, work with and work around the Phase 1 Contractor as necessary and as directed by the Resident.

Paving

The Contractor shall coordinate with the Phase 1 contractor to facilitate paving of the north lot as detailed on specification sheet CSK4, Paving Schedule, 66 Industrial Drive – Phase 1. The Phase 1 contractor is required to have all paving complete by September 15, 2014.

Moving

On August 1, 2014, the Department will be moving into the building after work identified in SECTION 01 10 00 – Summary 1.5A.1.a is complete and ready for turnover to the Department. The move includes moving and setting up large machinery that will require heavy equipment to move. The Contractor shall work cooperatively with the Department and its moving contractors to facilitate the move.

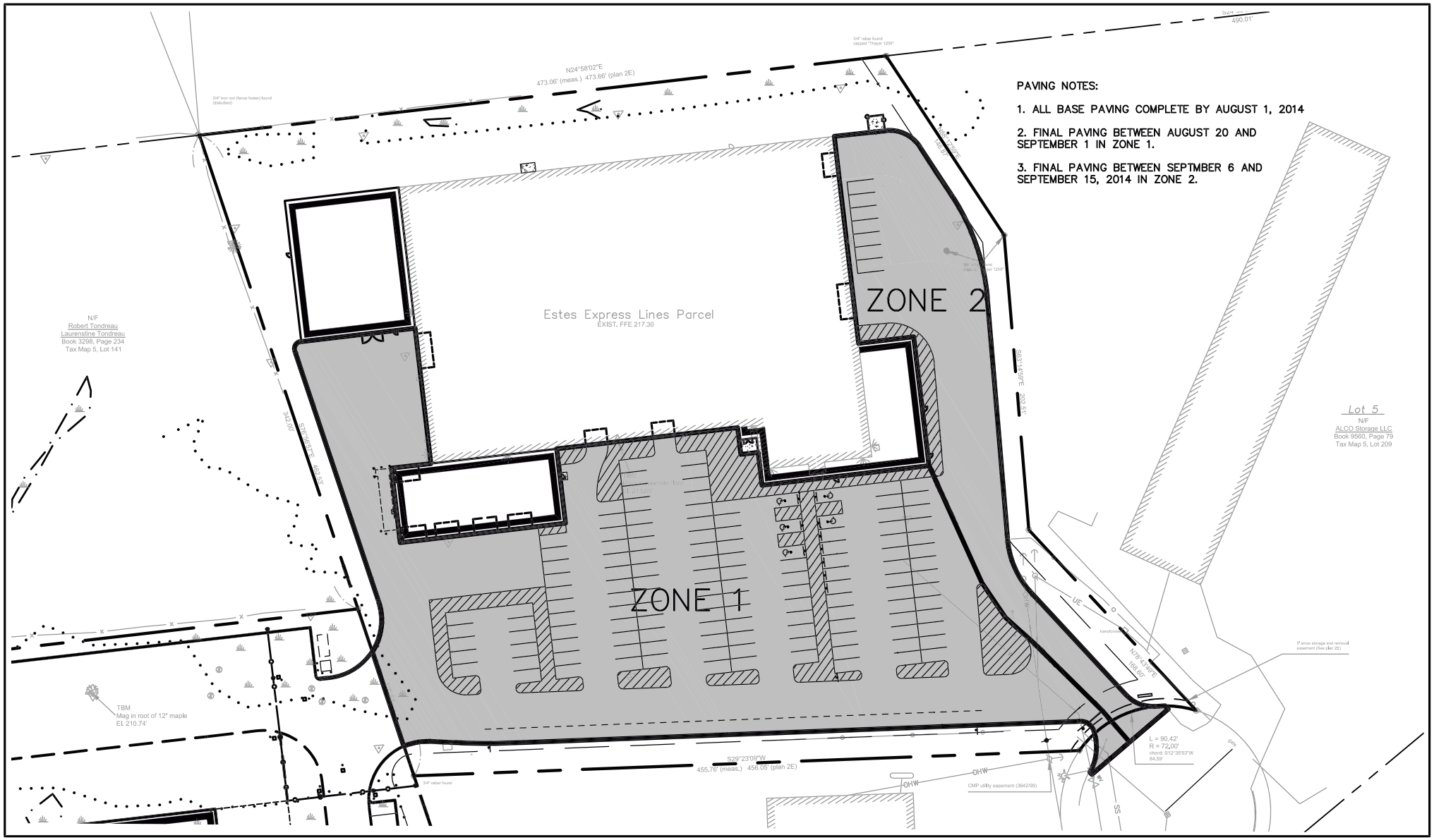
MEB

PAVING NOTES:

1. ALL BASE PAVING COMPLETE BY AUGUST 1, 2014

2. FINAL PAVING BETWEEN AUGUST 20 AND SEPTEMBER 1 IN ZONE 1.

3. FINAL PAVING BETWEEN SEPTMBER 6 AND SEPTEMBER 15, 2014 IN ZONE 2.



Rev.	Date	Revision
1	2/21/14	AMENDMENT #1

Design: WCH	Date: FEB 2014
Draft: CG	Job No.: 2798
Checked: WCH	Scale: 1"=60'
File Name: 2798-SP.dwg	

Gorrill-Palmer Consulting Engineers, Inc.
Engineering Excellence since 1998
PO Box 1237
15 Shaker Road
Gray, ME 04039
207-657-6910
FAX: 207-657-6912
E-Mail: mailbox@gorrillpalmer.com

Drawing Name: **Paving Schedule**

Project: **66 INDUSTRIAL DRIVE – PHASE 1**

Figure No. CSK4

SPECIAL PROVISION
SECTION 104.5.5
GENERAL RIGHTS AND RESPONSIBILITIES
Prompt Payment of Subcontractors

104.5.5

104.5.5 Prompt Payment of Subcontractors

A. Pay When Paid The Contractor shall pay Subcontractors for all Work satisfactorily performed and Invoiced by the Subcontractor no later than 30 Days from the date the Contractor receives payment from the Department for such Subcontractor's Work.

B. Payment Tracking Federal Projects On federally funded projects, the prime contractor, subcontractors and lower-tier subcontractors will track and confirm the delivery and receipt of all payments through the Elation System. They will be responsible for entering all payments to all sub and lower tier contractors. MaineDOT will run a query monthly to ensure that contractors are complying and generate an e-mail to contractors who have not responded to confirm receipt of MaineDOT payment or contractor payment to lower tier subcontractors.

C. Retainage The Contractor shall return to the Subcontractor all retainage withheld from the Subcontractor within 30 Days after the date the Subcontractor's Work is satisfactorily completed. If there is a Delay in such return of retainage, the Subcontractor may pursue all rights it may have under the claims procedure referenced in Section 104.5.6 - Subcontractor Claims for Payment.

SPECIAL PROVISION
SECTION 105
General Scope of Work
(Limitations of Operations)

The Contractor must notify the Department 24 hours prior to any change in work schedule.

The Contractor must notify the Department 48 hours prior to working any Saturdays.

SPECIAL PROVISION
SECTION 105
LEGAL RELATIONS WITH AND RESPONSIBILITY TO PUBLIC
(NPDES)

105.8.2 Permit Requirements This Section is revised by the addition of the following paragraph:

"The Contractor is advised that the Environmental Protection Agency has issued a final National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges from construction sites disturbing more than 2 ha [5 acres]. This permit requires:

- Storm Water Pollution Prevention Plan
- Submission of a Notification of Intent (NOI) at least 48 hours before construction commences
- Submission of a Notification of Termination (NOT) when a site has been finally stabilized and all storm water discharges from construction activities are eliminated.

If the project's land disturbances is 2 ha [5 acres] or more, the Department will prepare the plan and submit the NOI (and NOT). The Contractor shall prepare plans and submit NOI's (and NOT's) for regulated construction activities beyond the project limits (e.g., borrow pits).

The Contractor shall be familiar with and comply with these regulations."

SPECIAL PROVISION
SECTION 107
TIME
(Contract Time)

The contractor will be allowed to commence work provided that all required plans/submittals have been received and approved by the Department.

The specified Contract Completion Date is **October 1, 2014.** All Work must be Complete by the Contract Completion Date specified in the Contract, and any authorized extensions.

Augusta
20118.20
66 Industrial Drive, Phase 2
March 3, 2014

SPECIAL PROVISION
Section 107
TIME
(Limitation of Operations)
And
(Supplemental Liquidated Damages)

The Contractor shall plan work such that all work as identified in SECTION 01 10 00 – Summary 1.5A.1.a is complete by August 1, 2014. Supplemental liquidated damages shall be assessed the Contractor in the amount of One Thousand Dollars ($1,000.00) for each calendar day, beginning August 2, 2014 that the identified above work remains incomplete.

MEB

SPECIAL PROVISION
SECTION 107
TIME
(Scheduling of Work – Projected Payment Schedule)

Description The Contractor shall also provide the Department with a Quarterly Projected Payment Schedule that estimates the value of the Work as scheduled, including requests for payment of Delivered Materials. The Projected Payment Schedule must be in accordance with the Contractor's Schedule of Work and prices submitted by the Contractor's Bid. The Contractor shall submit the Projected Payment Schedule as a condition of Award.

SPECIAL PROVISION
SECTION 656
Temporary Soil Erosion and Water Pollution Control

This project is in the Bond Brook watershed, which is listed as a Class A water, which is listed as a Distinct Population Segment for *Atlantic Salmon* and is therefore, considered **SENSITIVE** in accordance with the BMP Manual. The Contractor's SEWPCP shall comply with Section II.B., Guidelines for Sensitive Waterbodies in the BMP Manual.

The following is added to Section 656 regarding Project Specific Information and Requirements. All references to the Maine Department of Transportation Best Management Practices for Erosion and Sedimentation Control (a.k.a. Best Management Practices manual or BMP Manual) are a reference to the latest revision of said manual. The latest version is dated "February 2008" and is available at:

http://www.maine.gov/mdot/env/documents/pdf/bmp2008/BMP2008full.pdf

Procedures specified shall be according to the BMP Manual unless stated otherwise.

Project Specific Information and Requirements

The following information and requirements apply specifically to this Project. The temporary soil erosion and water pollution control measures associated with this work shall be addressed in the Soil Erosion and Water Pollution Control Plan (SEWPCP.)

1. **A preconstruction field review is mandatory for this project. The preconstruction field review shall take place before commencing any work that involves soil disturbance or potential impacts on water quality. Attendees shall include the Environmental Coordinator, the preparer of the SEWPCP, the Construction Manager, and a representative from the Department's ENV Water Resources Unit. The date and time shall be set by the Contractor in consultation with the Construction Manager and ENV Water Resources Unit representative.**
2. **CLEARING LIMIT LINES SHALL BE MINIMIZED.** Clearing shall be minimized as shown on the design plans and be completed no later than October 1, 2014.
3. Due to the project sensitivity, **CONSTRUCTION SHALL BE PHASED** to limit the amount of disturbed area. The Contractor's SEWPCP shall include specific provisions for phasing the work. Each section must be stabilized to the approval of the MaineDOT Resident and the Water Resources Unit before work can begin on any subsequent section.
4. **DRAINAGE WORK SHALL NOT COMMENCE UNTIL AFTER APRIL 1ST OF ANY YEAR DUE TO HIGH GROUNDWATER LEVELS AND NUMEROUS INTERMITTENT WETLAND SWALES.** This date shall only be adjustable upon

SPECIAL PROVISION
SECTION 656
Temporary Soil Erosion and Water Pollution Control

approval of both the Construction Manager and a representative from the Water Resources Unit.

5. Newly disturbed earth shall be mulched by the end of each workday. Mulch shall be maintained on a daily basis.

6. All disturbed ditches/slopes shall be stabilized by the end of each workday. Stabilization shall be maintained on a daily basis.

7. Erosion control blanket shall be installed in the bottoms of all ditches except where a stone lining is planned. Seed shall be applied prior to the placement of the blanket.

8. The SEWPCP shall describe the location and method of temporary erosion and sediment control for existing and proposed catch basins, outlet areas and culvert inlets and outlets.

9. **If water is flowing within the drainage system, the water shall be diverted to a stable area or conduit and work shall be conducted in the dry.** The Contractor's plan shall address when and where the diversions will be necessary.

10. Permanent slope stabilization measures shall be applied within one week of the last soil disturbance. Temporary slope stabilization is required on a daily basis.

11. Permanent seeding shall be done in accordance with *Special Provision, Section 618, Seeding* unless the Contract states otherwise.

12. Culvert inlet and outlet protection shall be installed within 48 hours of culvert installation, or prior to a storm event, whichever is sooner.

13. Temporary winter stabilization must be used between November 1st and April 1st or outside of that time period if the ground is frozen or snow covered. Temporary winter stabilization involves, at a minimum, covering all disturbed soils and seeded ground that is not Acceptable Work with an approved method. If temporary winter stabilization practices are used then spring procedures for permanent stabilization shall also be described in the SEWPCP. Use of these methods for over-winter temporary erosion control will be incidental to the contract and be paid for as part of Pay Item 656.75.

SPECIAL PROVISION
SECTION 656
Temporary Soil Erosion and Water Pollution Control

14. If a cofferdam sedimentation basin is used, it shall be located in an upland area where the water can settle and sink into the ground or be released slowly to the resource in a manner that will not cause erosion. The location of such a cofferdam sedimentation basin shall be addressed in the SEWPCP.
15. Prior to release to a natural resource, any impounded water that has been in contact with sediment, shall have a turbidity no greater than the receiving resource. Water not meeting release criteria shall be addressed in the SEWPCP. Discharging impounded water to a stream or downgradient wetland must take place in a manner that does not disturb the stream bottom or cause erosion.
16. Any concrete that is placed or spilled (including leakage from forms) as well as indirect contact via tools or equipment shall not be released to a natural resource. It shall be released to an upland area within the project site. At the discretion of the MDOT Resident and/or ENV staff, it shall be removed from the project site and disposed of in accordance with the Maine Hazardous Waste, Septage and Solid Waste Management Act, 38 MRSA Section 1301 et seq and the Maine Solid Waste Management Regulations, 06-096 CMR Chapters 400-425.
17. Dust control items other than those under Standard Specification 637, if applicable, shall be included in the plan.

SPECIAL PROVISION
SECTION 815
(Building)

Description The work as defined in this contract, specifications/project manual and plans for 66 Industrial Drive in Augusta including renovations to existing pre-engineered metal building, demolition of existing office space, a new 2 story office addition, a new sign shop pre-engineered building addition, a new coatings, paint and wash bay addition, relocation of equipment, construction of a MaineDOT Fleet Storage Building.

For related provisions, see SECTION 01 10 00 SUMMARY 1.4 WORK COVERED BY CONTRACT DOCUMENTS.

Method of Measurement Building – 66 Industrial Drive will be measured for payment as one lump sum, complete in place and accepted.

Basis of Payment Building – 66 Industrial Drive will be paid for at the contract lump sum price, complete and accepted, which shall be full compensation for the work as called for in the contract indicated in the specifications/ project manual and the plans and as called for in the contract, including building renovation, addition, construction and demolition, utilities, grading, excavation, borrow, backfill, labor, equipment and materials and other contract related incidentals necessary to complete the work.

Payment will be made under:

	Pay Item	Pay Unit
815.00	Building – 66 Industrial Drive	Lump Sum

Allied Engineering

Structural Mechanical Electrical Commissioning

66 Industrial Drive / Phase 2

State WIN # 020118.20

66 Industrial Drive, Augusta, Maine

Maine Department of Transportation

Issued for Bid

Volume 1 of 4

Front End through 6

AEI 13-057

160 Veranda Street – Portland, ME 04103 – Ph. 207.221.2260 Fax 207.221.2266

www.allied-eng.com

VOLUME 1 OF 4 (MaineDOT Front End THROUGH 6)

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2.Building Assessment Report – Mold Contamination (Report)
3.Geotechnical Report
4.Maine DOT State WIN #020118.00 (Available upon request through Maine Department of Transportation)

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012600 Contract Modification Procedures
012900 Payment Procedures
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220529 Hangers and Supports for Plumbing Piping and Equipment
220553 Identification for Plumbing Piping & Equipment
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221514 Fuel Oil and Lubrication Oil Piping
223300 Electric Water Heaters
223500 Indirect-Fired Water Heaters
224000 Plumbing Fixtures

DIVISION 23 – HEATING, VENTILATION, AND AIR-CONDITIONING (HVAC)

230500 Common Work Results for Mechanical
230516 Braided Expansion Loops and Fittings
230519 Thermometers and Pressure Gauges
230529 Hangers and Supports for Piping and Equipment
230548 Mechanical Seismic Controls
230553 Identification for Mechanical
230593 Testing, Adjusting and Balancing
230700 Mechanical Insulation
230800 Commissioning of HVAC
230900 Instrumentation and Controls for HVAC
230901 Variable Frequency Drives
230993 Sequence of Operations for HVAC Controls
231123 Facility Fuel Gas Piping
232113 Hydronic HVAC Piping
232123 Hydronic Pumps
232300 Refrigerant Piping
233113 Ductwork

233423 Power and Gravity Ventilators
233424 Carbon Monoxide Exhaust Systems
233600 Air Terminal Units
233713 Diffusers, Registers and Grills
233813 Commercial Kitchen Hoods
235200 Hot Water Heating Boilers
235533 Fuel-Fired Unit Heaters
236200 Air Cooled Condensing Units
237200 Air-to-Air Energy Recovery Equipment
237313 Indoor Air-Handling Units
237333 Indirect-Fired H&V Units
237413 Rooftop Air Conditioners
238130 Ductless Split-System Air Conditioning Units
238239 Unit Heaters
238316 Radiant-Heating Hydronic Piping

VOLUME 3 OF 4 (DIVISIONS 24 THROUGH MaineDOT Back End)

DIVISION 24 – NOT USED

DIVISION 25 – INTEGRATED AUTOMATION – NOT USED

DIVISION 26 – ELECTRICAL

260100 Basic Electrical Requirements
260519 Low-Voltage Electrical Power Conductors and Cables
260523 Control-Voltage Electrical Power Cables
260526 Grounding and Bonding for Electrical Systems
260529 Hangers and Supports for Electrical Systems
260533 Raceways and Boxes for Electrical Systems
260543 Underground Ducts and Raceways for Electrical Systems
260544 Sleeves and Sleeve Seals for Electrical Raceways and Cabling
260548 Vibration and Seismic Controls for Electrical Systems
260553 Identification for Electrical Systems
260572 Overcurrent Protective Device Short-Circuit Study
260801 Commissioning of Electrical Systems
260923 Lighting Control Devices
260943 Network Lighting Controls
262416 Panelboards
262713 Electricity Metering
262726 Wiring Devices
262813 Fuses
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263213 Engine Generators
263600 Transfer Switches
265116 Fluorescent Interior Lighting
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265600 Exterior Lighting

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DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

280513 Conductors and Cables for Electronic Safety and Security
280801 Commissioning of Electronic Safety and Security Systems
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312200 Grading
312316 Excavation
312316.13 Trenching
312319 Dewatering

DIVISION 32 – EXTERIOR IMPROVEMENTS – NOT USED

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330513 Manholes and Structures
331116 Site Water Utility Distribution Piping
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333111 Site Sanitary Utility Sewerage Piping
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DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION - NOT USED

DIVISION 36 – 39 - NOT USED

END OF LIST OF SPECIFICATIONS

LIST OF DRAWINGS

66 INDUSTRIAL DRIVE – PHASE I (Available upon request through Maine Department of Transportation)

C001	COVER SHEET
	BOUNDRY SURVEY
C002	GENERAL NOTES & LEGEND
C003	PHASING PLAN
C004	DEMOLITION PLAN
C100	SITE PLAN – OVERALL
C101	SITE PLAN – NORTH
C102	SITE PLAN – SOUTH
C200	UTILITY PLAN – OVERALL
C201	UTILITY PLAN – NORTH
C202	UTILITY PLAN – SOUTH
C300	GRADING & DRAINAGE PLAN – OVERALL
C301	GRADING & DRAINAGE PLAN – NORTH
C302	GRADING & DRAINAGE PLAN – SOUTH
C401	STORM DRAIN PROFILES
C402	STORM DRAIN PROFILES
C403	SANITARY SEWER PROFILES
C500	SITE DETAILS
C501	UTILITY DETAILS
C503	DRAINAGE, EROSION & SEDIMENTATION CONTROL DETAILS
C504	EROSION & SEDIMENTATION CONTROL NOTES
C505	WET POND PLAN & DETAILS
L101	LANDSCAPE PLAN
ESD100	ELECTRICAL SITE DEMOLITION PLAN
ES100	ELECTRICAL SITE PLAN PART 1
ES101	ELECTRICAL SITE PLAN PART 2
ES500	ELECTRICAL SITE DETAILS

66 INDUSTRIAL DRIVE – PHASE II

G000	COVER
A001	ARCHITECTURAL CODE SUMMARY AND LIFE SAFTEY PLAN
AD101	ARCHITECTURAL - DEMO
A101	ARCHITECTURAL - FIRST FLOOR PLAN
A101A	ARCHITECTURAL - FIRST FLOOR PLAN - AREA-A
A101B	ARCHITECTURAL - FIRST FLOOR PLAN - AREA-B
A101C	ARCHITECTURAL - FIRST FLOOR PLAN - AREA-C
A101D	ARCHITECTURAL - FIRST FLOOR PLAN - AREA-D
A102	ARCHITECTURAL - SECOND FLOOR PLAN
A102D	ARCHITECTURAL - SECOND FLOOR PLAN - AREA-D
A103	ARCHITECTURAL - ROOF PLAN

A105	ARCHITECTURAL - DOT FLEET FLOOR PLAN
A121	ARCHITECTURAL - ENLARGED FLOOR PLAN
A122	ARCHITECTURAL - ENLARGED FLOOR PLAN
A123	ARCHITECTURAL - ENLARGED FLOOR PLAN
A131	ARCHITECTURAL - FIRST FLOOR REFLECTED CEILING PLAN
A131A	ARCHITECTURAL - FIRST FLOOR REFLECTED CEILING PLAN - AREA-A
A131B	ARCHITECTURAL - FIRST FLOOR REFLECTED CEILING PLAN - AREA-B
A131C	ARCHITECTURAL - FIRST FLOOR REFLECTED CEILING PLAN - AREA-C
A131D	ARCHITECTURAL - FIRST FLOOR REFLECTED CEILING PLAN - AREA-D
A132	ARCHITECTURAL - SECOND FLOOR REFLECTED CEILING PLAN
A132D	ARCHITECTURAL - SECOND FLOOR REFLECTED CEILING PLAN - AREA-D
A201	ARCHITECTURAL - EXTERIOR ELEVATIONS
A202	ARCHITECTURAL - EXTERIOR ELEVATIONS
A203	ARCHITECTURAL - EXTERIOR ELEVATIONS
A205	ARCHITECTURAL - EXTERIOR ELEVATIONS
A301	ARCHITECTURAL - BUILDING SECTIONS
A302	ARCHITECTURAL - BUILDING SECTIONS
A311	ARCHITECTURAL - TYPICAL WALL SECTIONS
A312	ARCHITECTURAL - WALL SECTIONS
A313	ARCHITECTURAL - WALL SECTIONS
A401	ARCHITECTURAL - PLAN DETAILS
A411	ARCHITECTURAL - SECTION DETAILS
A412	ARCHITECTURAL - SECTION DETAILS
A501	ARCHITECTURAL - CIRCULATION
A502	ARCHITECTURAL - CIRCULATION
A601	ARCHITECTURAL - DOOR, WINDOW AND PARTITION SCHEDULES
A602	ARCHITECTURAL - FINISH SCHEDULE AND DOOR DETAILS
A603	DOOR AND WINDOW DETAILS
S000	STRUCTURAL - NOTES
S001	STRUCTURAL - NOTES, SCHEDULES AND TYP. DETAILS
S002	STRUCTURAL - TYPICAL DETAILS
SD100	STRUCTURAL - FOUNDATION DEMOLITION PLAN
SD101	STRUCTURAL - ROOF DEMOLITION PLAN
SD200	STRUCTURAL - DEMOLITION ELEVATIONS
SB100A	STRUCTURAL - FOUNDATION PLAN - AREA-A
SB100B	STRUCTURAL - FOUNDATION PLAN - AREA-B
SB100C	STRUCTURAL - FOUNDATION PLAN - AREA-C
SB100D	STRUCTURAL - FOUNDATION PLAN - AREA-D
SB101	STRUCTURAL - DOT FLEET FOUNDATION PLAN
SB500	STRUCTURAL - FOUNDATION DETAILS

SB501	STRUCTURAL - FOUNDATION DETAILS
SF100	STRUCTURAL - MISC. FRAMING PLAN
SF100A	STRUCTURAL - FRAMING PLAN - AREA-A
SF100B	STRUCTURAL - FRAMING PLAN - AREA-B
SF100C	STRUCTURAL - FRAMING PLAN - AREA-C
SF100D	STRUCTURAL - FRAMING PLAN - AREA-D
SF101	STRUCTURAL - ROOF FRAMING PLAN
SF101C	STRUCTURAL - ROOF FRAMING PLAN - AREA-C
SF101D	STRUCTURAL - ROOF FRAMING PLAN - AREA-D
SF102	STRUCTURAL - DOT FLEET FRAMING PLAN
SF200	STRUCTURAL - BRACED FRAME SCHEMATICS
SF500	STRUCTURAL - DETAILS
SF501	STRUCTURAL - DETAILS
SF502	STRUCTURAL - DETAILS
PL000	PLUMBING AND HVAC NOTES, LEGEND AND ABBREVIATIONS
FP100	FIRE PROTECTION PLAN ~ FIRST FLOOR
FP101	FIRE PROTECTION PLAN ~ SECOND FLOOR
PL100A	PLUMBING PART PLAN ~ FIRST FLOOR - AREA A
PL100B	PLUMBING PART PLAN ~ FIRST FLOOR - AREA B
PL100C	PLUMBING PART PLAN ~ FIRST FLOOR - AREA C
PL100D	PLUMBING PART PLAN ~ FIRST FLOOR - AREA D
PL101D	PLUMBING PART PLAN ~ SECOND FLOOR - AREA D
PL300	FLUIDS / COMPRESSED AIR PLAN AND DETAILS
PL301	COMPRESSED AIR / VACUUM PART PLAN AND DETAILS
PL500	PLUMBING DETAILS
MH100A	MECHANICAL PART PLAN ~ FIRST FLOOR - AREA A
MH100B	MECHANICAL PART PLAN ~ FIRST FLOOR - AREA B
MH100C	MECHANICAL PART PLAN ~ FIRST FLOOR - AREA C
MH100D	MECHANICAL PART PLAN ~ FIRST FLOOR - AREA D
MH101C	MECHANICAL PART PLAN ~ MEZZANINE - AREA C
MH101D	MECHANICAL PART PLAN ~ SECOND FLOOR - AREA D
MH102	MECHANICAL ROOF PLAN
MH600	MECHANICAL SCHEDULES
MP100A	MECHANICAL PIPING PART PLAN ~ FIRST FLOOR - AREA A
MP100B	MECHANICAL PIPING PART PLAN ~ FIRST FLOOR - AREA B
MP100C	MECHANICAL PIPING PART PLAN ~ FIRST FLOOR - AREA C
MP100D	MECHANICAL PIPING PART PLAN ~ FIRST FLOOR - AREA D
MP101C	MECHANICAL PIPING PART PLAN ~ MEZZANINE - AREA C
MP101D	MECHANICAL PIPING PART PLAN ~ SECOND FLOOR - AREA D
ES100	ELECTRICAL - SITE PLAN ~ PART 1
ES101	ELECTRICAL - SITE PLAN ~ PART 2
ES500	ELECTRICAL - SITE DETAILS
E000	ELECTRICAL LEGENDS, GENERAL NOTES AND ABBREVIATIONS

EL100A	ELECTRICAL - LIGHTING PLAN - AREA A
EL100B	ELECTRICAL - LIGHTING PLAN - AREA B
EL100C	ELECTRICAL - LIGHTING PLAN - AREA C
EL100D	ELECTRICAL - LIGHTING PLAN - AREA D
EL101D	ELECTRICAL - LIGHTING PLAN - SECOND FLOOR AREA D
EL200	ELECTRICAL - ENLARGED LIGHTING DETAILS
EL400	ELECTRICAL - LIGHTING DETAILS AND LUMINAIRE SCHEDULE
EP100A	ELECTRICAL - POWER AND SYSTEMS PLAN - AREA A
EP100B	ELECTRICAL - POWER AND SYSTEMS PLAN - AREA B
EP100C	ELECTRICAL - POWER AND SYSTEMS PLAN - AREA C
EP100D	ELECTRICAL - POWER AND SYSTEMS PLAN - AREA D
EP101C	ELECTRICAL - POWER AND SYSTEMS PLAN - MEZZANINE AREA C
EP101D	ELECTRICAL - POWER AND SYSTEMS PLAN - SECOND FLOOR AREA D
EP102	ELECTRICAL - ROOF PLAN
EP400	ELECTRICAL POWER RISER DIAGRAM
EP401	FIRE ALARM RISER DIAGRAM
EP-600	ELECTRICAL SCHEDULES
EP-601	ELECTRICAL SCHEDULES
EP-602	ELECTRICAL SCHEDULES
EP-603	ELECTRICAL SCHEDULES
EP-604	ELECTRICAL SCHEDULES
EP-605	ELECTRICAL SCHEDULES
EP-606	ELECTRICAL SCHEDULES
EP-607	ELECTRICAL SCHEDULES
EP-608	ELECTRICAL SCHEDULES

END OF DRAWING LIST

END OF TABLE OF CONTENTS

SECTION 00 30 00 – INFORMATION AVAILABLE TO BIDDERS

A. The following items are additional information available to bidders:

1. Building Assessment Report – Mold Contamination (Letter)
2. Building Assessment Report – Mold Contamination (Report)
3. Geotechnical Report
4. Maine DOT State WIN #020118.00, 66 industrial drive Phase 1 plans and specifications (Available upon request through Maine Department of Transportation)

END OF SECTION 00 30 00

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BATES ENVIRONMENTAL HEALTH & SAFETY
INDUSTRIAL HYGIENE CONSULTING

BUILDING ASSESSMENT REPORT
MOLD CONTAMINATION

BGS FLEET SERVICES BUILDING
66 INDUSTRIAL ROAD
AUGUSTA, MAINE

November 1, 2013

211 Soper Road Orland, Maine 04472 • telephone: 207.242.0754 • fax: 866.324.6930 • Email: behs@earthlink.net

Introduction

Bates Environmental Health & Safety was requested by Allied Engineering to perform a limited-scope building assessment for mold contamination inside the warehouse/distribution-style building at 66 Industrial Drive, Augusta, Maine. This assessment was requested in response to visible water damage and strong mold odor observed during a previous site visit.

The building is being considered for future use by BGS' Central Fleet Management division.

The project scope of services consisted of the following tasks: Visual inspection for water damage and mold growth (WD&M); Moisture content measurements at WD&M locations; Sampling & microscopic analysis for mold; and Preparation of a summary report.

Office Area

The following is a listing of findings with discussion describing the existing conditions in this section of the building including observations and direct onsite measurements:

- A strong mold odor was noticed upon entry into the building.
- Visible water damage and mold growth were considered significant on the surfaces of most interior walls, ceilings, building components and occupant items. The mold growth observed on the 1st and 2nd Floors was typical of a building area experiencing episodes of flooding and condensation, respectively
- A sewage overflow originating from a 1st Floor toilet drain flange was observed during the site visit (Photo 1).

Warehouse Area

The following is a listing of findings with discussion describing the existing conditions in this section of the building including observations, laboratory analysis and direct onsite measurements:

- A strong mold odor was noticed upon entry into the warehouse section of the building.
- Water damage from roof and wall leaks were observed in several locations.
- Visible dust and mold growth were observed on the interior surfaces of the exterior wall insulation. The insulation system consisted of fiberglass batt insulation laminated to an interior polymer facing. Microscopic examination of the polymer facing identified dust/soot particles and significant fungal growth *Cladosporium spp.* (Photo 2).
- The bottom 2 inches of fiberglass insulation at the base of the exterior walls was found wet to the touch in several locations (Photo 3).
- Rodent nests, feces and urine were observed in the fiber glass insulation along the lower sections of the exterior walls. Openings of ¼" to ¾" were observed between the base of the walls and the concrete foundation (Photo 4).

- Visible mold growth was observed on several OSB panels located around the perimeter of the building. The mold appears to be a result of moisture due to condensation and water damage from roof/wall leaks.
- Dark residue observed on the concrete floor in several areas did not have any significant levels of fungal growth.

Recommendations

The following recommendations are based on the findings and conclusions of this project and are consist with good industrial hygiene/facility management practices:

R-1 This assessment's findings in the office area support the engineer's preliminary recommendation of complete demolition. In an effort to control the migration of mold and other contaminants, a physical barrier should be installed to protect the warehouse prior to demolition.

R-2 The insulation and vapor barrier on the exterior walls and roof should be completely removed using controlled removal methods consistent with the New York City Department of Health 'Guidance for Mold Assessment and Remediation' procedures. This recommendation is supported by the aforementioned findings in the areas investigated, as well as the following potential and magnitude for the following hidden conditions:

- Condensation in the exterior walls and roof;
- Water infiltration thru penetrations in the building envelope; and
- Magnitude of suspected rodent infestation.

Recommendations

This report was prepared by Bates Environmental Health & Safety solely for Allied Engineering and State of Maine bureau of General Services. This report represents Bates EH&S' professional judgment based on generally accepted methodologies and assessments. If conditions differ from those described in this report at some later date, we request the opportunity to review such differences and to amend this report, if appropriate. No reproduction of this report is allowed unless in full, without the written authorization from the Owner or Bates Environmental Health & Safety. This PDF report has been distributed via electronic mail to the following recipient(s):

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LAB RESULTS

Please Reply To:

AmeriSci Bio-Chem
13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

EMAIL TRANSMISSION

To: Jamie Noel
Optimum Analytical & Consulting, LLC

From: Justin B. Liverman

Client Project: 1307656; BGS Fleet Services Bldg; Mold Assessment

AmeriSci Job #: 313101119

Subject: Microbiology 48 hour Results

Date: Thursday, October 24, 2013

Time: 10:58:37

Number of Pages: 3
(including cover sheet)

Email Message:

To: jamie.noel@optimumanalytical.com,kristina.scaviola@optimumanalytical.com
From: jliverman@amerisci.com
Subject: AmeriSci Results for BGS Fleet Services Bldg (313101119)
Message:

CONFIDENTIALITY NOTICE: Unless otherwise indicated, the information contained in this communication is confidential information intended for use of the individual named above. If the reader of this communication is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is prohibited. If you have received this communication in error, please immediately notify the sender by telephone and return the original message to the above address via the US Postal Service at our expense. Preliminary data reported here will be verified before final report is issued. Samples are disposed of in 60 days or unless otherwise instructed by the protocol or special instructions in writing. Thank you.

AmeriSci Bio-Chem
13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

AmeriSci Job #:
313101119
FINAL REPORT

Client: Optimum Analytical & Consulting, LLC
Address: 85 Stiles Road, Suite 201
Salem, NH 03079

Client Job#: 1307656
Client Job Name: BGS Fleet Services Bldg; Mold Assessment

Direct Fungal Identification (SOP# 3.21.01)

Date Received: 10/23/13
Date Reported: 10/24/13

AmeriSci Job # 313101119-01

Sample #: M-1 **Sample description:** Insulation Barrier - White/Foil Sides **Analysis Date:** 10/24/13

Fungal Identification	Estimated Amount	Comments
Ascospores	Rare	
Aspergillus/Penicillium	Light	
Cladosporium sp.	Heavy	
Hyphae	Moderate	

AmeriSci Job # 313101119-02

Sample #: M-2 **Sample description:** FG Insulation - Yellow - Area of No W Da **Analysis Date:** 10/24/13

Fungal Identification	Estimated Amount	Comments
Ascospores	Rare	
Aspergillus/Penicillium	Rare	
Cladosporium sp.	Rare	
Hyphae	Rare	

AmeriSci Job # 313101119-03

Sample #: M-3 **Sample description:** Dark Residue On Floor **Analysis Date:** 10/24/13

Fungal Identification	Estimated Amount	Comments
Ascospores	Rare	
Aspergillus/Penicillium	Rare	
Basidiospores	Rare	
Cladosporium sp.	Rare	

Minimum reporting limit is no fungi detected

Rare: 1 - 10 Spores **Light: 11 - 100 Spores** **Moderate: 101 - 200 Spores** **Heavy: 200+ Spores**

Results relate only to the items tested.

Name/Title: Justin B. Liverman / Analyst
Signature:
Date: 10/24/13

Name/Title: Justin B. Liverman / Analyst
Reviewed By:
Date: 10/24/13

#313101119

AMERISCI
BIO-CHEM

13635 Genito Road Midlothian, VA 23112
(804) 763-1200 Phone / (804) 763-1800 Fax
AIHA ACCREDITED 175122

Contact Information

Company: Optimum Analytical & Consulting, LLC PO#:
Address: 85 Stiles Rd, Ste 201 Salem, NH 03079
Results To: Jamie Noel / Kristina Seaviola Fax Results? Y (N) Fax:
Phone: 603-458-5247 Email (Y) / N Jamie.noel@optimumanalytical.com Kristina.seaviola@optimumanalytical.com

Project Information

Project Name: Fleet BGS^ Services Bldg Mold Assessment
Project #: 13076056
Invoice To:
Sampling Date(s):

Turnaround Time Codes

STD – Standard: 2 Days (Non-viable)
24 – 24: 24 Hours (Non-viable)
R – Rush: Same Day (Non-viable)
C – Culture: 7-14 Days
W – Weekends: Scheduled by noon ET Friday Only
***Samples received after 5pm, on weekends or in drop-box, will be considered received the next business day.

Requested Services (X Boxes)

Non-Viable		Culturable				
Spore Trap	Tape Bulk	Andersen, Swab, Bulk				
Fungal Spore Count and Genus ID, pollen, fiber & mycelial fragment count	Fungal Genus Identification – Qualitative	Environmental Fungal Genus ID & Enumeration	Environmental Bacterial Enumeration & Gram Stain ID	Fungal Speciation – Scheduled in Advance Only	Bacterial speciation – Scheduled in Advance Only	

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	Notes: (Time, Temp, Etc.)	Fungal Genus Identification – Qualitative
M-1	Insulation Barrier - white/Foil sides					X
M-2	FG Insulation - Yellow - Area of No W Damage					X
M-3	Dark Residue on floor					X
	Bulk - Direct Read					

RECEIVED OCT 23 2013

Sample Type Codes

AP – Andersen Plate
SW - Swab
B - Bulk
T - Tape
ST - Spore Trap: Zefon, Micro5, Cyclex-d, etc.

Relinquished By	Date & Time	Received By	Date & Time

PHOTOS

PHOTO 1 SEWAGE OVERFLOW IN OFFICE AREA OCCURRED DURING SITE VISIT. THE BLACKWATER COVERED APPROXIMATELY 40% OF FLOOR AREA. THIS AREA WAS SUBSEQUENTLY CLEANED BY BGS.

PHOTO 2: SECTION OF EXTERIOR WALL INSULATION WITH AREAS OF DARK DISCOLORATION. THE INSULATION SYSTEM OBSERVED CONSISTED OF FIBERGLASS BATT INSULATION (YELLOW) LAMINATED TO AN INTERIOR POLYMER/FOIL FACING (WHITE). MICROSCOPIC EXAMINATION OF FACING IDENTIFIED DUST PARTICLES AND HEAVY MOLD GROWTH - CLADOSPORIUM.

PHOTO 3: INSULATION WAS FOUND WET AT BASE OF EXTERIOR WALL IN SEVERAL LOCATIONS.

PHOTO 4: RODENT NESTS, URINE AND FECES WERE OBSERVED IN THE FIBERGLASS INSULATION IN THE LOWER SECTIONS OF EXTERIOR WALLS. OPENINGS OF $\frac{1}{4}$" TO $\frac{3}{4}$" WERE OBSERVED BETWEEN THE BASE OF WALL AND CONCRETE FOUNDATION.

PHOTO 5: VISIBLE WATER DAMAGE AND SIGNIFICANT MOLD GROWTH OBSERVED ON INTERIOR OSB PANELS. PANELS LOCATED AROUND THE PERIMETER OF THE WAREHOUSE AREA FUNCTION AS A PROTECTIVE BARRIER FROM ACCIDENTAL WALL/INSULATION PUNCTURE.

PHOTO 6: DARK RESIDUE WAS OBSERVED ON CONCRETE FLOOR THROUGHOUT THE WAREHOUSE AREA. MICROSCOPIC EXAMINATION DID NOT IDENTIFY SIGNIFICANT MOLD GROWTH. MOLD LEVELS CONSIDERED NORMAL OR TYPICAL FOR CONCRETE SURFACES IN NORTHERN NEW ENGLAND BUILDINGS.

BATES ENVIRONMENTAL HEALTH & SAFETY

211 SOPER ROAD
ORLAND, MAINE 04472
FAX 866-324-6930
CELL 207-242-0754
EMAIL behs@earthlink.net

December 12, 2013

Jim Hodsdon
Allied Engineering, Inc.
160 Veranda Street
Portland, ME 04103

Re: Mold Evaluation of Roof Insulation
Maine BGS Fleet Services Building

Dear Mr. Hodsdon:

Bates Environmental Health & Safety was requested by Allied Engineering to perform additional sampling of the roof insulation for mold contamination at the 66 Industrial Drive , Augusta, Maine. This assessment was requested following the initial findings of water damaged fiberglass batt insulation and mold contamination in the exterior walls (refer to Nov. 1, 2013 report).

The additional assessment scope of services consisted of the following tasks: Visual inspection of the roof insulation for water damage and mold growth (WD&M); Moisture content measurements at WD&M locations; Sampling & microscopic analysis for mold; and Preparation of a summary report.

Warehouse Area

The following is a listing of findings with discussion describing the existing conditions of the roof insulation in this section of the building including observations, laboratory analysis and direct onsite measurements:

- The insulation system consisted of fiberglass batt insulation installed against the metal roof inside an interior polymer facing.
- Examination of the polymer facing and insulation identified dust/soot particles.
- Water damage from roof leaks was observed in several locations.
- The top 1 inch of fiberglass insulation was found wet to the touch in all locations inspected, most-likely a result of condensation.
- Eight (8) bulk samples of insulation and polymer vapor barrier did not identify ant significant fungal growth (refer to attached Lab Report).
- Visible dust was observed at the seams of the roof insulation (⅛" - ½" opening at each seam). These openings or penetrations are conducive to building heat loss and moisture condensation on metal.

Recommendations

The following recommendations are based on the findings and conclusions of this project and are consist with good industrial hygiene/facility management practices:

R-1 Due to numerous openings in the fiberglass insulation at the vapor barrier seams, additional evaluation should be performed to determine building envelope integrity and excessive heat loss.

Closure

This report was prepared by Bates Environmental Health & Safety solely for Allied Engineering and State of Maine bureau of General Services. This report represents Bates EH&S' professional judgment based on generally accepted methodologies and assessments. If conditions differ from those described in this report at some later date, we request the opportunity to review such differences and to amend this report, if appropriate. No reproduction of this report is allowed unless in full, without the written authorization from the Owner or Bates Environmental Health & Safety. This PDF report has been distributed via electronic mail to the following recipient(s):

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Please review this report and if you have any questions or concerns, give me a call at your convenience.

Thank you for requesting Bates Environmental Health & Safety to assist you and your staff in maintaining a safe and healthy building environment.

Sincerely,

Gary M Bates, President
Bates Environmental Health & Safety

LAB RESULTS

AmeriSci Bio-Chem
13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

AmeriSci Job #:
313111098
FINAL REPORT

Client: Optimum Analytical & Consulting, LLC
Address: 85 Stiles Road, Suite 201
Salem, NH 03079

Client Job#:
Client Job Name: Bates - 7950

Direct Fungal Identification (SOP# 3.21.01)

Date Received: 11/27/13
Date Reported: 12/02/13

AmeriSci Job # 313111098-01

Sample #: M-10 **Sample description:** Center Peak - Foil Side Of Poly Barrier **Analysis Date:** 12/02/13

Fungal Identification	Estimated Amount	Comments
Ascospores	Rare	
Aspergillus/Penicillium	Rare	
Cladosporium sp.	Rare	

AmeriSci Job # 313111098-02

Sample #: M-11 **Sample description:** Center Peak - FG Insulation **Analysis Date:** 12/02/13

Fungal Identification	Estimated Amount	Comments
Aspergillus/Penicillium	Rare	

AmeriSci Job # 313111098-03

Sample #: M-12 **Sample description:** North Side - FG Insulation **Analysis Date:** 12/02/13

Fungal Identification	Estimated Amount	Comments
Ascospores	Rare	
Basidiospores	Rare	
Cladosporium sp.	Rare	

AmeriSci Job # 313111098-04

Sample #: M-13 **Sample description:** North Side - Discolored FG At Seam **Analysis Date:** 12/02/13

Fungal Identification	Estimated Amount	Comments
Aspergillus/Penicillium	Rare	
Cladosporium sp.	Rare	

AmeriSci Job # 313111098-05

Sample #: M-14 **Sample description:** NW Corner - FG In Area Of WD **Analysis Date:** 12/02/13

Fungal Identification	Estimated Amount	Comments
Aspergillus/Penicillium	Rare	

Minimum reporting limit is no fungi detected

Rare: 1 - 10 Spores **Light: 11 - 100 Spores** **Moderate: 101 - 200 Spores** **Heavy: 200+ Spores**

Results relate only to the items tested.

AmeriSci Bio-Chem
13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

AmeriSci Job #:
313111098
FINAL REPORT

Client: Optimum Analytical & Consulting, LLC
Address: 85 Stiles Road, Suite 201
Salem, NH 03079

Client Job#:
Client Job Name: Bates - 7950

Direct Fungal Identification (SOP# 3.21.01)

Date Received: 11/27/13
Date Reported: 12/02/13

AmeriSci Job # 313111098-06

Sample #: M-15 **Sample description:** SW Edge - FG In Area Of WD **Analysis Date:** 12/02/13

Fungal Identification	Estimated Amount	Comments
Aspergillus/Penicillium	Rare	

AmeriSci Job # 313111098-07

Sample #: M-16 **Sample description:** East Side - FG - No WD **Analysis Date:** 12/02/13

Fungal Identification	Estimated Amount	Comments
Aspergillus/Penicillium	Rare	

AmeriSci Job # 313111098-08

Sample #: M-17 **Sample description:** Vapor Barrier - White Side **Analysis Date:** 12/02/13

Fungal Identification	Estimated Amount	Comments
Aspergillus/Penicillium	Rare	

Minimum reporting limit is no fungi detected

Rare: 1 - 10 Spores **Light: 11 - 100 Spores** **Moderate: 101 - 200 Spores** **Heavy: 200+ Spores**

Results relate only to the items tested.

Name/Title: Justin B. Liverman / Analyst
Signature:
Date: 12/02/13

Name/Title: Justin B. Liverman / Analyst
Reviewed By:
Date: 12/02/13

#313111068 #313111098

AMERISCI BIO-CHEM

13635 Genito Road Midlothian, VA 23112
(804) 763-1200 Phone / (804) 763-1800 Fax
AIHA ACCREDITED 175122

77

Requested Services (X Boxes)						
Non-Viable		Culturable				
Spore Trap	Tape Bulk	Andersen, Swab, Bulk				
Genus ID, pollen, fiber Fragment count	Quantitative	ID & Enumeration	Environmental Bacterial Enumeration & Gram Stain ID	Fungal Speciation – Scheduled in Advance Only	Bacterial speciation – Scheduled in Advance Only	

Contact Information

Company: Optimum Analytical and Consulting, LLC PO#:

Address: 85 Stiles Road Salem, NH 03079

Results To: Jamie Noel, Kristina Scaviola Fax Results? Y / N Fax:

Phone: 603-458-5247 Email Y / N jamie.noel@optimumanalytical.com kristina.scaviola@optimumanalytical.com

Project Information

Project Name: BATES · 7950

Project #:

Turnaround Time Codes

STD – Standard: 2 Days (Non-viable)

24 – 24-24 Hr

Time and Temperature at collection

Sample Number	Description and location	
M-10	Center Peak - Foil side of Poly Barrier (analyze foil side only)	
* M-11	Center Peak - FG insulation (analyze darker yellow area)	
* M-12	North Side - FG insulation (no WD)	
* M-13	North Side - Discolored FG at seam	
* M-14	NW corner - FG in area of WD	
* M-15	SW edge - FG in area of WD	
* M-16	East Side - FG - no WD	
M-17	Vapor Barrier - White side (analyze white side only)	
	* analyze areas of dark yellow in FG samples	

PROJECT: BGS CENTRAL FLEET - MOLD ASSESSMENT II

Bio-Chem

REL. - 11/26/13

Date & Time

RECEIVED NOV 27 2013 By

REPORT

November 7, 2013
13-0520 S

Geotechnical Engineering Services

MaineDOT BGS Fleet Services
66 Industrial Drive
Augusta, Maine

PREPARED FOR:
Allied Engineering, Inc.
Attention: William P. Faucher, P.E., LEED AP, RRC
160 Veranda St.
Portland, Maine 04103

PREPARED BY:
S. W. Cole Engineering, Inc.
555 Eastern Avenue
Augusta, Maine 04330
(207) 626-0600

S.W.COLE ENGINEERING, INC.

- *Geotechnical Engineering*
- *Construction Materials Testing*
- *GeoEnvironmental Services*
- *Ecological Services*

www.swcole.com

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Attachment A	Limitations
Sheet 1	Exploration Location Plan
Sheets 2 through 25	Exploration Logs
Sheet 26	Key to the Notes and Symbols
Sheets 27 and 28	Laboratory Test Results
Sheet 29	Foundation Underdrain Detail

13-0520 S

November 7, 2013

Allied Engineering, Inc.
Attention: William P. Faucher, P.E., LEED AP, RRC
160 Veranda St.
Portland, Maine 04103

Subject: Geotechnical Engineering Services
MaineDOT BGS Fleet Services
66 Industrial Drive
Augusta, Maine

Dear Bill:

In accordance with our Agreement dated September 17, 2013, S. W. Cole Engineering, Inc. (S.W.COLE) has made a subsurface investigation and geotechnical evaluation for the Maine Department of Transportation (MaineDOT) Bureau of General Services (BGS) Fleet Services project at 66 Industrial Drive in Augusta, Maine. The contents of this report are subject to the limitations set forth in Attachment A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information at the site in order to provide geotechnical recommendations for foundations, earthwork and pavements associated with the proposed construction. Our scope of services included coordination and observation of 15 test borings and ten test pits, soils laboratory testing, a geotechnical analysis of the subsurface findings and preparation of this report.

1.2 Proposed Construction

We understand MaineDOT is planning to renovate an existing building and develop an approximately 40 acre site for the relocation of MaineDOT and BGS Fleet Services, MaineDOT Region 2 Offices, BGS Surplus Property and OIT Radio Operations. Based

on the provided plans, we understand the proposed development will consist of renovations and three new additions to an existing 61,500 square foot (SF) warehouse building and the construction of a new approximately 49,500 SF building in an undeveloped parcel located south of the existing building. Based on our site observations, the undeveloped parcel is currently heavily forested with several lower lying wet areas. Details regarding the proposed finish floor elevations (FFE's) and structural loading were not available at the time of this report. However, we anticipate the proposed additions to the existing building will match the existing structure and the proposed new building FFE will be within about 1-foot of the proposed exterior finish grade elevation of 211 feet. Based on the existing and proposed site grading, we anticipate tapered fills of up to 4 feet and cuts up to 4 feet will be needed to achieve the proposed building additions and new building grades. We anticipate the new building and the additions will likely be steel-famed with masonry exterior.

Additionally, we understand a paved access drive, paved and gravel-surfaced parking and laydown areas as well as stormwater management areas are proposed around the structures. We understand proposed site grading indicates fills of up to 5 feet and cuts of up to 4 feet could be required to achieve site grades. We understand stormwater management areas are proposed on the southern and southeasterly edges of the site with invert depths at about elevations 193 and 200 feet, respectively, requiring cuts of up to 14 feet.

Proposed and existing site features are shown on the "Exploration Location Plan," attached as Sheet 1.

2.0 EXPLORATION AND TESTING

2.1 Explorations

Fifteen test borings (B-1 through B-15) were made at the site on September 30 and October 1, 2013 by Great Works Test Boring (GWTB) of Gorham, Maine working under subcontract to S.W.COLE. Ten test pits (TP-1 through TP-10) were made at the site on October 2, 2013 by Landworks Excavation, LLC of Winthrop, Maine working under subcontract to S.W.COLE. The exploration locations were selected and located in the field by S.W.COLE using a mapping grade GPS unit. Borings B-1 through B-7 and Test Pit TP-10 were made for the proposed building additions and existing paved areas and

Borings B-8 through B-15 and Test Pits TP-1 through TP-9 were made for the proposed new development. The approximate exploration locations are shown on the "Exploration Location Plan" attached as Sheet 1.

Logs of the explorations are attached as Sheets 2 through 25 and a key to the notes and symbols used on the logs is attached as Sheet 26. Elevations shown on the exploration logs were estimated based on interpolation between existing contours shown on Sheet 1.

2.2 Testing

The test borings were made using auger and cased, rotary-wash drilling techniques. Soil sampling was generally performed at 5-foot intervals using a split spoon sampler and Standard Penetration Testing (SPT) methods. Where softer cohesive soils were encountered, Shelby Tube samples were obtained using a piston sampler and Vane Shear Testing (VST) was performed to evaluate in-situ soil strength. SPT and VST results are shown on the attached logs.

Soil samples obtained from the test borings were returned to our laboratory for classification and testing. Laboratory testing was performed on selected samples recovered from the explorations. The results of one grain size analysis and a one-dimensional consolidation test are attached as Sheets 27 and 28, respectively.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Conditions

The proposed site consists of an existing building and development at 66 Industrial Drive and a 40 acre, heavily wooded and undeveloped property on the southern side of the existing development. The ground surface is hummocky with several lower lying wet areas and appears to have been logged in the past.

3.2 Soil Conditions

Building Additions and Existing Pavements: Explorations within the existing developed area generally encountered a surface layer of asphalt pavement or topsoil overlying loose to medium dense, brown silty sand with varying amounts of gravel to depths of about 1.5 to 4.0 feet followed by medium stiff to stiff, brown clayey silt to about 6 to

11 feet becoming medium stiff to soft, gray silty clay to about 38 feet followed by loose, gray sand with some silt and silty clay seams.

New Building: Explorations within the proposed new building area generally encountered a surface layer of forest duff overlying loose, brown silt with varying amounts of sand and clay to depths of about 3.0 to 5.5 feet followed by stiff to medium stiff, brown clayey silt to about 8.5 to 11 feet becoming medium stiff to soft, gray silty clay to about 36 to 43.5 feet followed by granular soils. Where sampled, the granular soils were observed to consist of dense gray silty sand and gravel with cobbles (glacial till).

Paved and Gravel Surfaced Areas: Explorations within the proposed paved and gravel surfaced areas generally encountered a surface layer of forest duff overlying brown sand with varying amounts of silt to depths of about 2 to 6 feet followed by gray silt with varying amounts of sand and clay.

Stormwater Management Areas: Explorations within the stormwater management areas generally encountered a surface layer of forest duff overlying brown silt with varying amounts of sand to depths of about 10.0 to 12.5 feet followed by gray silty clay.

Please refer to the attached exploration logs for more detailed subsurface information.

3.3 Groundwater Conditions

At the time of our explorations, groundwater was observed in B-5 through B-13 and B-15 at depths of 6.5 to 11 feet. Considering the low permeability of the underlying clayey soils, we anticipate the surficial soils will be saturated on a seasonal basis with a groundwater table near the ground surface. It should be anticipated that seasonal groundwater levels will fluctuate, especially in response to periods of snowmelt and heavy precipitation.

3.4 Frost and Seismic Considerations

The 25-year Air Freezing Index for the Augusta, Maine area is about 1,400 Fahrenheit degree-days, which corresponds to a frost penetration depth on the order of 5.0 feet.

Based on the findings at the test borings, we interpret the site soils to correspond to Seismic Site Class E in accordance with IBC 2012 (N-value and Shear Strength methods). Further, information obtained during our subsurface explorations indicates liquefaction of soils is not a design consideration.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 Foundation Options and Discussion

Based on the subsurface findings and our understanding of the proposed construction, it is our opinion the proposed construction appears feasible from a geotechnical standpoint. We offer the following considerations for foundations, utilities, and reuse of site soils:

- Foundations: We anticipate the proposed structure can be supported on shallow spread footing foundations provided the subgrade soils are not disturbed and properly prepared.

  The proposed building additions and new structure are underlain by relatively compressible gray silty clay and will require tapered fills of up to 4 feet to achieve finish grade. Our settlement analysis indicates post-construction settlement could result in up to 1 inch of settlement beneath the new building and proposed additions. Differential settlements across the buildings are estimated to be about ½ inch or less.

  The site has soil limitations that must be considered during design and construction. The native soils are moisture sensitive and subject to strength loss during construction. A smooth-edged bucket should be used to excavate to foundation subgrade.

- Buried Utility Considerations: Based on the subsurface findings, we anticipate utilities located in cut areas and some deeper trench bottoms may encounter the underlying compressible gray silty clays. For this condition, we recommend pipes be supported on at least 12 inches of crushed stone wrapped in geotextile fabric and manholes and buried structures be supported on at least 2 feet of

crushed stone wrapped in geotextile fabric. Excavation to subgrade in the native clays should be made using a smooth-edged bucket.

- Reuse of Site Soils: The native soils are generally unsuitable for reuse as backfill for the building and paved areas. Imported Granular Borrow will be required to raise building and pavement area grades. Imported Structural Fill will be required for foundation backfill and slab base material.

These and other geotechnical recommendations should be taken into consideration during design and construction.

4.2 Settlement and Stability Analyses

4.2.1 Settlement Analysis

The gray silty clays underlying the site are compressible and will consolidate under the weight of new fills and building loads resulting in post-construction settlement. We have completed an analysis of post-construction settlement considering laboratory consolidation test results and anticipated site grading. For the proposed building and new additions, we estimate total consolidation-related, post-construction settlement could approach 1 inch with differential post-construction settlement approaching a ½ inch. We anticipate this settlement will occur over a period of decades.

4.2.2 Slope Stability Analysis

We performed global stability analyses through the proposed wet ponds where a 14-foot deep cut will be needed to achieve grade. The stability calculations were made using a two-dimensional stability model and SLOPE/W computer software. Our global stability analyses utilized a method of slices assuming moment equilibrium, and were based on: 1) our current understanding of the project; 2) visual observations of the site and laboratory testing; 3) information obtained at the explorations and 4) existing and proposed site topography shown on Sheet 1.

Our analyses indicate the safety factor against a deep rotational failure for the proposed wet ponds to be greater than 2.0 for static conditions and 1.3 for seismic conditions. Safety factors of 1.3 are considered acceptable for transient loading conditions. Safety factors of at least 1.5 are considered acceptable for general site slopes for long-term

conditions. Based on our analysis, the factors of safety against a deep rotational failure are at or above the acceptable thresholds for the proposed construction.

4.3 Site and Subgrade Preparation

4.3.1 General Site

Site preparation should begin with the construction of an erosion control system to minimize siltation into drainage-ways and areas outside the construction limits. The soils that will be exposed are susceptible to erosion. As much vegetation as possible should be allowed to remain undisturbed adjacent to the construction site and when applicable, construction should occur in phases to reduce areas of disturbance and lessen the potential for erosion. Temporary erosion and sediment control such as mulch, erosion control mats, seeding, and sod should be used in soil areas to be exposed for extended periods of time.

Topsoil, stumps and roots, should be removed from the proposed construction areas. Actual grubbing depths to remove topsoil and organics will depend on the contractor's construction methods. A greater grubbing depth may be needed during wet weather periods and in wet areas.

4.3.2 Buried Utilities

Based on the subsurface findings and our understanding of the proposed construction, we anticipate deeper buried utilities may encounter soft gray clay at the base of trench excavations. We anticipate medium stiff to soft, gray silty clay or unstable trench bottoms will be encountered in cut areas. We recommend utilities in cut areas be underlain with at least 12-inches of crushed stone wrapped in non-woven geotextile fabric such as Mirafi 160N and structures be founded on at least 2 feet of crushed stone wrapped in Mirafi 160N. Excavations to subgrade in soft gray clay and native brown clayey silts should be completed with a smooth-edged bucket.

4.4 Excavation and Dewatering

Excavation work will encounter areas of materials susceptible to strength loss when subjected to construction traffic and excavation activities, particularly during periods of precipitation. Care must be exercised during construction to minimize disturbance of the native soils. Should subgrade soils become soft, yielding or difficult to work, the

subgrade should be over-excavated and backfilled with compacted Structural Fill. Excavation into native soils should be completed with a smooth-edged bucket to lessen subgrade disturbance and low-pressure tracked equipment will be needed until site grades are raised about 3 feet.

The contractor should anticipate the need for dewatering in excavations particularly following periods of precipitation and snow melt. Based on the relatively low permeability of the underlying silty and clayey soils, we anticipate ditching with gravity drainage and sumping and pumping should be adequate to control groundwater seepage in shallow excavations. Deep excavations into native soils may require sheet-piling for groundwater cut-off and excavation support. In all cases, excavations must be properly shored and/or sloped in accordance with OSHA regulations to prevent sloughing and caving of the sidewalls during construction.

4.5 Foundation Design

Based on the subsurface findings and our understanding of the proposed construction, we anticipate building footings will be founded on stiff, brown native silty clay transitioning to compacted granular borrow underlain by stiff native clays. For foundations founded on properly prepared subgrades, we recommend the following geotechnical parameters for design of spread footings and foundations:

Geotechnical Parameters for Spread Footings and Foundation Walls	
Design Frost Depth	5.0 feet
Seismic Site Class (IBC 2009, N-value and Vane Shear methods)	E
Net Allowable Soil Bearing Pressure	1.5 ksf or less
Unit Weight of Backfill (Structural Fill)	125 pcf
Friction Angle of Backfill (Structural Fill)	30 deg
At-Rest Lateral Earth Pressure Coefficient (Structural Fill)	0.5
Base Friction Factor (concrete on Granular Borrow)	0.35

We recommend unheated portions of the proposed building be founded on 12 inches of Structural Fill followed by 3 inches of extruded polystyrene insulation with a minimum compressive strength of 40 psi overlying at least 12 inches of compacted Structural Fill underlain by stiff native clays or prepared subgrades.

Wall footings should be at least 18 inches wide and column footings at least 36 inches in least lateral dimension.

4.6 Slab-on-Grade Floors

We recommend on-grade concrete floors be supported on a minimum of 12 inches of compacted Structural Fill underlain by compacted granular fills or undisturbed stiff native soils overlying a non-woven geotextile fabric, such as Mirafi 160N or equivalent. On-grade floor slabs founded on properly prepared subgrades may be designed considering a modulus of subgrade reaction of 120 pci. The structural engineer or concrete consultant must design steel reinforcing and joint spacing appropriate to slab thickness and function.

We recommend consideration of a sub-slab vapor retarder, particularly in areas of the building where the concrete slab will be covered with an impermeable surface treatment or floor covering that may be sensitive to moisture vapors, to reduce the potential for floor covering damage from moisture. The vapor retarder shall have a permeance that is less than the floor cover that is applied to the slab. The vapor retarder must have sufficient durability to withstand direct contact with the sub-slab base material and construction activity. The vapor retarder material shall be placed according to the manufacturer's recommended method, including the taping and lapping of all joints and wall connections. The architect and/or flooring consultant should select the vapor retarder products compatible with flooring and adhesive materials.

The floor slab should be appropriately cured using moisture retention methods after casting. Typical floor slab curing methods should be used for at least 7 days. The architect or flooring consultant should assign curing methods consistent with current applicable American Concrete Institute (ACI) procedures with consideration of curing method compatibility to proposed flooring and adhesive materials.

4.7 Foundation Drainage

We recommend underdrains be provided near footing grade along the exterior side of perimeter wall footings. We recommend SDR-35 underdrain pipe with perforations of ¼ to ½ inch oriented downward enveloped with at least 6 inches of ¾ inch Crushed Stone drainage aggregate that is wrapped in a non-woven geotextile filter fabric, such as Mirafi 160N or equivalent. The underdrains must have positive gravity outlets protected from

freezing. Exterior foundation backfill should be sealed with a surficial layer of clayey or loamy soil in areas that are not to be paved or occupied by entrance slabs. This is to reduce direct surface water infiltration into the backfill. Ideally, surface grades should be sloped away from the building to shed surface water. General "Foundation Underdrain Detail" is shown on Sheet 29.

4.8 Entrances, Sidewalks and Exterior Slabs

Entrances, Sidewalks and Exterior Slabs should be designed to mitigate potentially adverse frost action. We recommend Structural Fill be provided to a depth of at least 5.0 feet below exterior finished grades for entrance slabs and sidewalks abutting building areas. The Structural Fill should extend outward from the building at least 5.0 feet thereafter sloping up to adjacent sidewalk or pavement gravels at a 3(H):1(V) incline. This frost transition will help reduce the potential for abrupt differential movement due to frost action. Details regarding the frost transition zone of Structural Fill below entrance slabs are shown on Sheet 29.

4.9 Embankment Construction

We understand several cuts and fills will be needed to achieve finish grade for site fill areas. Embankments constructed on existing soil slopes steeper than 4(H):1(V) should be keyed into the existing ground surface with continuous level benches. We recommend a 10-foot wide bench be cut into the native soil at the toe of slope for fill embankments. A 1-foot thick (minimum) drainage blanket of granular fill should be placed over the initial bench prior to placing embankment fill. Embankments constructed on existing soil slopes flatter than 4(H):1(V) may be constructed without continuous benching.

Soil slopes will be susceptible to surface erosion, slumping and sloughing, particularly during heavy rain and freeze/thaw events. We recommend slope faces be covered with topsoil and seed. Topsoil and seed should be installed, as soon as practicable, to create a vegetated mat over the entire surface of the slope. Slopes that are 2.5(H):1(V) and steeper should be covered with an erosion control fabric. In areas where surface water is concentrated and discharged over the slope, we recommend covering the slope with rip-rap placed over a layer of crushed gravel and a woven filter fabric.

4.10 Fill Materials and Compaction

Based on our experience and the subsurface findings, we recommend the use of the following fill materials for construction:

Granular Borrow: A mixture of sand, silt, and gravel or crushed concrete, brick and blasted bedrock that is crushed and blended with sand to create a compactable fill meeting the following gradation:

GRANULAR BORROW (MAINEDOT 703.22)	
Sieve Size	Percent Finer by Weight
6 inch	100
No. 40	0 to 70
No. 200	0 to 10

Granular Borrow is recommended for use as:

- Backfill to raise site grades up to the bottom of foundations, and paved and gravel area subbase
- Material to construct new embankment fills

Structural Fill: Clean, non-frost susceptible, sand, and gravel free of organics and other deleterious materials meeting the following gradation:

STRUCTURAL FILL / MAINEDOT 703.06 TYPE C BASE (MODIFIED)	
Sieve Size	Percent Finer by Weight
3 inch	100
¼ inch	25 to 75
No. 40	0 to 30
No. 200	0 to 5
MaineDOT 703.06 Type C Modified to 3-inch max Aggregate	

Structural Fill is recommended for use as:

- Backfill against foundations and retaining walls
- Backfill within frost transition zone below building entrance slabs
- Fill within frost zone below exterior slabs
- Base gravel below on-grade floor slabs

- Backfill for repair of soft or yielding areas above water table
- Drainage blanket below toe of embankment

Crushed Stone: Crushed, washed, hard, durable rock meeting the gradation requirements for MaineDOT 703.22 Underdrain Backfill Material Type 'C'.

Crushed Stone is recommended for use as:

- 12-inch working mat below buried pipes
- 24-inch working mat below buried structures, manholes and vaults
- Backfill for repair of soft or yielding areas below the water table
- Drainage aggregate around underdrains

Placement and Compaction: Fill should be placed in horizontal lifts and be compacted. Lift thickness should typically range from 6 to 12 inches, but is dependent upon the size and type of equipment such that the desired density is achieved throughout the lift thickness within 3 to 5 passes of the compaction equipment.

We recommend granular fills placed below the building and paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. Foundation backfill should be compacted to at least 95 percent of ASTM D-1557. Fill within landscape areas should be compacted to at least 90 percent of ASTM D-1557. Crushed stone should be compacted to 100 percent of its dry-rodded unit weight as determined by ASTM C-29.

4.11 Pavements

Paved areas will include standard duty (car parking areas) and heavy duty (access drive, truck parking, and truck routes). We recommend the following pavement structures utilizing materials presented in the 2002 Maine Department of Transportation Standard Specifications:

FLEXIBLE (ASPHALT) PAVEMENTS		
Pavement Layer	**Standard Duty (Car Parking)**	**Heavy Duty (Access Drives)**
HMA Wearing Course, MaineDOT 9.5 mm Superpave or Grade C	1¼ inch	1¼ inch
HMA Binder Course, MaineDOT 19.0 mm Superpave or Grade B	2¼ inches	2¾ inches
Crushed Gravel Base, MaineDOT 703.06 Type A	6 inches	9 inches
Granular Subbase, MaineDOT 703.06 Type D	12 inches	15 inches
Woven Geotextile Fabric (Mirafi 500X or equivalent)		

The base and subbase materials should meet the above specifications and should be compacted to at least 95 percent of their maximum dry density as determined by ASTM D-1557. We recommend granular fills placed below the base and subbase materials be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. Due to the moisture sensitive native subgrade soils and presence of high groundwater, we recommend the use of a woven geotextile fabric, such as Mirafi 500X or equivalent, below paved areas on native silty or clayey soils. The bituminous pavement should be compacted to 92 to 97 percent of its theoretical maximum density as determined by ASTM D-2041. A tack coat should be used between successive lifts of bituminous pavement.

4.12 Stormwater Management Areas

Two stormwater management areas are proposed to be constructed on the southerly and southeasterly sides of the proposed development area. Based on existing and proposed grading the stormwater management areas will require cuts of about 4 to 14 feet. We anticipate these excavations will generally encounter stiff, brown silty clay with deeper cuts encountering the medium stiff to soft, gray silty clay. We anticipate the design team will likely desire to use the excavated stiff, brown silty clay as fill for stormwater management berms. These materials may be reused for this purpose provided that they are at a moisture content that is workable for meeting project compaction requirements. Some drying of the native silty clay should be anticipated prior to and during berm construction. Use of these materials will be difficult during periods of wet weather or in winter conditions.

The berm soil should be a material free from organics, frozen matter and other deleterious substances. The berm fill should be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-698. The fill should be compacted at or slightly wet of optimum moisture. The 3(H):1(V) slopes planned for the ponds are susceptible to surface erosion, particularly during heavy rain and freeze/thaw events. Topsoil and seed should be installed, as soon as practicable, to create a vegetated mat over the entire surface of the slope. We recommend consideration of a sand blanket be placed on clayey soils for silt control and turbidity mitigation. We anticipate that erosion control mesh will be used to reinforce the surface soils for the 2.5(H):1(V) and steeper slopes. The erosion control mesh used should be a UV resistant synthetic product.

4.13 Weather Considerations

The site soils are sensitive to moisture and frost. As such, these soils can become disturbed during wet and freezing conditions resulting in loss of strength. In all cases, sitework and construction activities should take appropriate measures to protect exposed subgrades. The site soils may require drying and thawing before activities may continue. The contractor should anticipate the need for moisture conditioning of fills to facilitate compaction during dry or wet weather.

Construction activity during wet and cold weather should be undertaken in a manner that considers construction schedule relative to frozen soils. If foundation construction takes place during cold/freezing weather conditions, subgrades, foundations and floor slabs must be protected from freezing conditions. Concrete and fills must not be placed on frozen soil and once placed, the fills and soil beneath structures must be protected from freezing.

4.14 Design Review and Construction Testing

S.W.COLE should be retained to review the final design and specifications to determine that our earthwork and foundation recommendations have been properly interpreted and implemented. Additionally, S.W.COLE should be retained to provide supplemental engineering and testing services during the excavation and foundation phases of the project. S.W.COLE should be on-site to observe subgrades prior to fill or concrete placement.

A soils and concrete testing program should be implemented during construction to observe compliance with the design concepts, plans, and specifications. S.W.COLE is available to provide field and laboratory testing services for soil, concrete, steel, masonry, spray-applied fire-proofing, and asphalt construction materials. We would be pleased to provide a scope of services and budget for Special Inspections and Field and Laboratory Testing at the appropriate time.

5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the construction phase of the project.

Sincerely,

S. W. Cole Engineering, Inc.

Michael A. St. Pierre, P.E.
Geotechnical Engineer

MAS:rec

Attachment A
Limitations

This report has been prepared for the exclusive use of Allied Engineering, Inc. for specific application to the MaineDOT BGS Fleet Services project at 66 Industrial Drive in Augusta, Maine. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of services has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.

LEGEND:

APPROXIMATE BORING LOCATION

APPROXIMATE TEST PIT LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN WAS PREPARED FROM A DRAFT, 1"=100' SCALE PLAN OF THE SITE ENTITLED "GRADING & DRAINAGE PLAN, OVERALL," PREPARED BY GORILL-PALMER CONSULTING ENGINEERS, IN., DATED AUGUST 28, 2013.
2. THE BORINGS WERE LOCATED IN THE FIELD BY GPS SURVEY BY S.W. COLE ENGINEERING, INC. USING A MAPPING GRADE TRIMBLE GPS RECEIVER AND OVERLAID ON THE ABOVE REFERENCED PLAN USING EXISTING SITE FEATURES AS CONTROL.
3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S.W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

NO.	DATE	DESCRIPTION	BY
1	11/07/2013	FINAL REPORT SUBMISSION	CEM
--	11/01/2013	DRAFT REPORT SUBMISSION	CEM

S.W. COLE ENGINEERING, INC.

ALLIED ENGINEERING, INC.

EXPLORATION LOCATION PLAN

MAINEDOT BGS FLEET SERVICES
66 INDUSTRIAL DRIVE
AUGUSTA, MAINE

Job No.: 13-0520 Scale: 1" =100'
Date : 11/01/2013 Sheet: 1

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-1**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	2 1/4" O.D.	-	-
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										BROWN SAND AND GRAVEL, TRACE SILT (FILL)
	1D	24"	2"	2.0'	4	5	7	4	1.6'	~ MEDIUM DENSE ~
										BROWN CLAYEY SILT, SOME FINE SAND
	2D	24"	8"	4.0'	3	3	4	6	4.0'	~ MEDIUM STIFF ~
										BOTTOM OF EXPLORATION AT 4.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

2

BORING NO.: **B-1**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-2**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT
										BROWN GRAVEL WITH SAND AND COBBLES, SOME SILT (FILL)
									2.2'	~ MEDIUM DENSE ~
	1D	24"	18"	3.5'	9	7	4	5	3.5'	BROWN CLAYEY SILT, SOME FINE SAND ~ STIFF ~
										BOTTOM OF EXPLORATION AT 3.5 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

3

BORING NO.: **B-2**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-3**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT
									1.8'	BROWN GRAVEL WITH SAND, SOME SILT (FILL) ~ DENSE ~
	1D	24"	16"	2.2'	7	24	11	8		BROWN SILTY SAND, WITH SILT LAYERS
									3.5'	~ MEDIUM DENSE ~
	2D	24"	18"	4.2'	5	7	6	5	4.2'	BROWN CLAYEY SILT, SOME FINE SAND ~ STIFF ~
										BOTTOM OF EXPLORATION AT 4.2 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

4

BORING NO.: **B-3**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-4**
SHEET:	1 OF 2
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER OBSCURED BY USE OF DRILLING FLUID

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT
										BROWN SAND AND GRAVEL, SOME SILT (FILL)
	1D	24"	3"	2.2'	9	14	11	11	2.5'	~ MEDIUM DENSE ~
										BLUE-GRAY CLAYEY SILT, WITH ORGANICS (REWORKED NATIVE)
										~ SOFT ~
									6.0'	
	2D	24"	24"	7.0'	1	2	2	5		BLUE/GRAY SILTY CLAY
										~ SOFT ~
	3D	24"	24"	12.0'	WOH/24"					WITH OCCASIONAL THIN SAND SEAMS
	1S	24"	22"	17.0'						
	1V	9"	-	17.8'	3 1/2"X7" ACKER VANE					S_v = 0.61 ksf / 0.11 ksf
	1V'	9"	-	18.5'	3 1/2"X7" ACKER VANE					S_v = 0.68 ksf / 0.10 ksf ~ MEDIUM STIFF ~
									25.0'	
	2V	9"	-	25.8'	3 1/2"X7" ACKER VANE					S_v = 0.60 ksf / 0.10 ksf
	2V'	9"	-	26.5'	3 1/2"X7" ACKER VANE					S_v = 0.77 ksf / 0.15 ksf
										BLUE/GRAY SILTY CLAY WITH FINE SAND SEAMS
										~ MEDIUM STIFF ~
	2S	24"	20"	32.0'						
	3V	9"	-	32.8'	3 1/2"X7" ACKER VANE					S_v = 0.87 ksf / 0.13 ksf
	3V'	9"	-	33.5'	3 1/2"X7" ACKER VANE					S_v = 0.90 ksf / 0.16 ksf
	4D	24"	14"	37.0'	WOR/24"					
									38.0'	
										GRAY FINE SAND, SOME SILT, WITH SILTY CLAY SEAMS
										~ LOOSE ~

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-4**
SHEET:	2 OF 2
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER OBSCURED BY USE OF DRILLING FLUID

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										GRAY FINE SAND, SOME SILT, WITH SILTY CLAY SEAMS
	5D	24"	12"	42.0'	3	2	3	1	42.0'	~ LOOSE ~
										BOTTOM OF EXPLORATION AT 42.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-5**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 6.5' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.2'	ASPHALT
	1D	24"	6"	2.2'	4	5	7	5	3.0'	BROWN SILTY SAND AND GRAVEL (FILL) ~ MEDIUM DENSE ~
	2D	24"	24"	7.0'	4	6	6	7	8.0'	BROWN CLAYEY SILT, MOTTLED ~ STIFF ~ q_p = 3.5 ksf
	3D	24"	24"	12.0'	1	2	2	3	13.0'	BROWN SILTY CLAY, WITH SILTY SAND SEAMS ~ SOFT ~ q_p = 0.5 - 1.0 ksf
	4D	24"	24"	17.0'	WOH/24"				17.0'	GRAY SILTY CLAY ~ VERY SOFT ~
										BOTTOM OF EXPLORATION AT 17.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

7

BORING NO.: **B-5**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-6**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 8' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.4'	TOPSOIL
	1D	24"	12"	2.0'	WOH/12"		2	3		BROWN SILTY SAND (FILL) ~ LOOSE ~
									4.0'	
	2D	24"	24"	7.0'	3	4	5	7		BROWN CLAYEY SILT, MOTTLED ~ STIFF ~
									11.0'	
	3D	24"	24"	12.0'	WOH/24"				12.0'	GRAY SILTY CLAY, ~ VERY SOFT ~
										BOTTO OF EXPLORATION AT 12.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

8

BORING NO.: **B-6**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-7**
SHEET:	1 OF 2
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 8' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.4'	TOPSOIL
	1D	24"	19"	2.0'	1	2	5	5		BROWN SAND, SOME SILT (FILL) ~ LOOSE ~
									3.5'	
	2D	24"	24"	7.0'	3	7	8	11		q_p = 5.4 ksf q_p = 3.4 ksf BROWN CLAYEY SILT, TRACE SAND ~ STIFF TO VERY SOFT ~
	3D	24"	24"	12.0'	WOH/24"				11.5'	q_p = 0.5 ksf
										GRAY SILTY CALY ~ VERY SOFT ~
										HYDRAULIC PUSH ROD PROBE (12-38') (PROBABLE SILTY CLAY)
									38.0'	
										ADVANCED BY HAMMER DRIVEN ROD PROBE (38-39.0') 30 BLOWS (39-40.0') 22 BLOWS

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-7**
SHEET:	2 OF 2
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 8' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										ADVANCED BY HAMMER DRIVEN ROD PROBE (40-41.0') 22 BLOWS
										(41-42.0') 24 BLOWS
										(42-43.0') 21 BLOWS
									44.0'	(43-44.0') 20 BLOWS
										(PROBABLE SANDS)
										BOTTOM OF EXPLORATION AT 44.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

10

BORING NO.: **B-7**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-8**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 11.0' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.4'	FOREST DUFF
	1D	24"	18"	2.0'	1/12"		3	7		BROWN CLAYEY SILT, SOME SAND ~ MEDIUM STIFF ~
									4.0'	
	2D	24"	24"	7.0'	5	6	7	7		q_p = 3 - 3.5 ksf ~ STIFF ~ BROWN CLAYEY SILT, TRACE SAND ~ MEDIUM STIFF ~
									11.0'	
	3D	24"	24"	12.0'	1	1	2	2		q_p = 0.5 - 1.0 ksf GRAY SILTY CLAY ~ SOFT ~
										HYDRAULIC PUSH ROD PROBE (12-38.5') (PROBABLE SILTY CLAY)
									38.5'	ADVANCED BY HAMMER DRIVEN ROD PROBE 25 BLOWS / 0"
										BOTTOM OF EXPLORATION AT 38.5 FEET (PROBABLE GLACIAL TILL)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

11

BORING NO.: B-8

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-9**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 10.0' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.5'	FOREST DUFF
	1D	24"	14"	2.0'	1	1	3	3		BROWN CLAYEY SILT, SOME SAND ~ MEDIUM STIFF ~
									3.5'	
	2D	24"	24"	7.0'	4	6	7	8		q_p = 5.0 - 6.0 ksf BROWN CLAYEY SILT; q_p = 3.0 ksf ~ STIFF ~
									9.0'	
	3D	24"	24"	12.0'	WOH/12"		2	2	12.0'	q_p = 1.5 ksf BROWN CLAY AND SILT, WITH THIN SAND SEAMS; q_p = 0.5 ksf ~ SOFT ~
										HYDRAULIC PUSH ROD PROBE (12-36') (PROBABLE SILTY CLAY)
									36.1'	ADVANCED BY HAMMER DRIVEN ROD PROBE (36.0-36.1') 50 BLOWS
										ROD PROBE REFUSAL AT 36.1' (PROBABLE GLACIAL TILL)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

12

BORING NO.: B-9

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-10**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 10.0' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.5'	FOREST DUFF
	1D	24"	20"	2.0'	WOH/12"		4	4		BROWN SILT, SOME SAND AND CLAY ~ LOOSE ~
									4.0'	
	2D	24"	24"	7.0'	4	5	7	9		q_p = 5.0 ksf, q_p = 6.0 ksf — BROWN CLAYEY SILT ~ STIFF ~
									10.0'	
	3D	24"	24"	12.0'	WOH/24"				12.0'	q_p = 1.0 - 2.0 ksf — BROWN SILT AND CLAY ~ VERY SOFT ~
										BOTTOM OF EXPLORATION AT 12.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-11**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 9.5' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.5'	FOREST DUFF
	1D	24"	18"	2.0'	WOH/12"		2	2		BROWN SANDY SILT ~ SOFT ~
									4.0'	
	2D	24"	24"	7.0'	3	6	4	7		BROWN CLAYEY SILT q_p = 3.5 ksf ~ STIFF ~
									10.5'	
	3D	24"	24"	12.0'	WOH/24"				12.0'	GRAY CLAYEY SILT ~ VERY SOFT ~
										BOTTOM OF EXPLORATION AT 12.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-12**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 10.0' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.8'	TOPSOIL
	1D	24"	18"	2.0'	1/18"			5	3.0'	BROWN CLAYEY SILT, TRACE SAND ~ VERY SOFT ~
	2D	24"	24"	7.0'	4	5	7	9	9.0'	BROWN CLAYEY SILT ~ STIFF ~ q_p = 2.0 ksf q_p = 4.0 ksf q_p = 3.0 ksf
	3D	24"	24"	12.0'	3	3	4	4	14.0'	GRAY SILT AND CLAY ~ MEDIUM STIFF ~ q_p = 2.0 ksf
	4D	24"	24"	17.0'	WOH/24"				17.0'	GRAY SILTY CLAY ~ VERY SOFT ~
										BOTTOM OF EXPLORATION AT 17.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-13**
SHEET:	1 OF 1
PROJECT NO.:	13-0520
DATE START:	9/30/2013
DATE FINISH:	9/30/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 10.0' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.4'	FOREST DUFF
	1D	24"	16"	2.0'	1/12"		1	3	1.5'	BROWN SILT AND FINE SAND, WITH ROOTS, ~ VERY LOOSE ~
									4.0'	BROWN SILTY SAND ~ VERY LOOSE ~
	2D	24"	24"	7.0'	4	5	8	8	9.0'	BROWN CLAYEY SILT ~ STIFF ~
	3D	24"	24"	12.0'	1	2	2	3	12.0'	GRAY SILTY CLAY ~ MEDIUM STIFF TO SOFT ~
										BOTTO OF EXPLORATION AT 12.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

16

BORING NO.: B-13

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-14**
SHEET:	1 OF 2
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER OBSCURED BY USE OF DRILLING FLUID

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.6'	FOREST DUFF
	1D	24"	16"	2.0'	WOH/18"			3		BROWN SILTY SAND ~ VERY LOOSE ~
									5.5'	
	2D	24"	24"	7.0'	3	6	6	6		BROWN CLAYEY SILT ~ STIFF ~
									10.0'	
	3D	24"	24"	12.0'	WOH	1	2	2		~ SOFT TO MEDIUM STIFF ~ GRAY SILTY CLAY
	1S	24"	16"	17.0'						
	1V	9"	-	17.8'	3 1/2"X7" ACKER VANE					S_v = 0.83 ksf / 0.12 ksf ~ MEDIUM STIFF ~
	1V'	9"	-	18.5'	3 1/2"X7" ACKER VANE				19.0'	UNABLE TO PUSH
	2V	9"	-	20.8'	3 1/2"X7" ACKER VANE					S_v = 0.98 ksf / 0.13 ksf
	2V'	9"	-	21.5'	3 1/2"X7" ACKER VANE					S_v = 1.09 ksf / 0.20 ksf GRAY SILTY CLAY WITH FINE SAND SEAMS ~ MEDIUM STIFF TO STIFF ~
	2S	24"	22"	27.0'						
	3V	9"	-	27.8'	3 1/2"X7" ACKER VANE					S_v = 100 FT-LBS (NO ROTATION)
	4D	24"	24"	32.0'	1	1	1	2		
									34.0'	
	5D	24"	24"	37.0'	WOH/18"			3		GRAY SILTY CLAY ~ MEDIUM STIFF ~
									39.0'	
									40.0'	GRAY SILTY SAND AND GRAVEL, (GLACIAL TILL)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS: CONTINUED…

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-14**
SHEET:	2 OF 2
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER OBSCURED BY USE OF DRILLING FLUID

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										GRAY SILTY SAND AND GRAVEL, (GLACIAL TILL)
	6D	24"	22"	42.0'	16	18	16	20	42.0'	~ DENSE ~
										BOTTOM OF EXPLORATION AT 42.0 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

18

BORING NO.: **B-14**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-15**
SHEET:	1 OF 2
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 10.0' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.4'	FOREST DUFF
	1D	24"	2"	2.0'	1	1	2	3		BROWN SILTY SAND
									3.0'	~ VERY LOOSE ~
	2D	24"	24"	7.0'	3	5	5	8		BROWN CLAYEY SILT q_p = 3.5 - 4.0 ksf ~ STIFF ~
									8.5'	
	3D	24"	24"	12.0'	WOH/24"					GRAY SILTY CLAY ~ SOFT ~
										HYDRAULIC PUSH ROD PROBE (12-43.5') (PROBABLE SILTY CLAY)
									40.0'	

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS: CONTINUED…

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.:	**B-15**
SHEET:	2 OF 2
PROJECT NO.:	13-0520
DATE START:	10/1/2013
DATE FINISH:	10/1/2013
ELEVATION:	
SWC REP.:	A.STRUGATSKIY

PROJECT / CLIENT: PROPOSED MAINEDOT BGS FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
DRILLING CO. : GREAT WORKS TEST BORING DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4"	140 LBS	30"
SAMPLER:	SS	1 5/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 10.0' BELOW GROUND SURFACE

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										(PROBABLE SILTY CLAY)
									43.5'	ADVANCED BY HAMMER DRIVEN ROD PROBE (43.5-44.5') 41 BLOWS
										(44.5-45.5') 40 BLOWS
									46.5'	(45.5-46.5') 39 BLOWS (PROBABLE GLACIAL TILL)
										BOTTOM OF EXPLORATION AT 46.5 FEET

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: PROPOSED MAINEDOT FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
BACKHOE FIRM: LANDWORKS EXCAVATION, LLC
OPERATOR: PAUL BERNIER
PROJECT NO.: 13-0520
SWC REP.: AAS

TEST PIT TP-1

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.5'	FOREST DUFF	
		1.7'	BROWN SAND AND SILT	
		6.4'	GRAY CLAYEY SILT, SOME FINE SAND	
			BOTTOM OF EXPLORATION AT 6.4 FEET	

COMPLETION DEPTH: 6.4' DEPTH TO WATER: NOT ENCOUNTERED

TEST PIT TP-2

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.5'	FOREST DUFF	
		1.2'	BROWN SILTY SAND	
		5.0'	BROWN FINE SAND, TRACE SILT	
		6.0'	GRAY SANDY SILT	
			BOTTOM OF EXPLORATION AT 6.0 FEET	

COMPLETION DEPTH: 6.0' DEPTH TO WATER: 2.7'

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: PROPOSED MAINEDOT FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
BACKHOE FIRM: LANDWORKS EXCAVATION, LLC
OPERATOR: PAUL BERNIER
PROJECT NO.: 13-0520
SWC REP.: AAS

TEST PIT TP-3

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.4'	FOREST DUFF	
		1.4'	BROWN SILTY SAND	
		5.5'	TAN FINE SAND, TRACE SILT	
		6.4'	GRAY SANDY SILT	
			BOTTOM OF EXPLORATION AT 6.4 FEET	

COMPLETION DEPTH: 6.4' DEPTH TO WATER: 6.0'

TEST PIT TP-4

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.5'	FOREST DUFF	
		1.4'	BROWN SILTY SAND	
		5.8'	TAN FINE SAND, TRACE SILT	
			BOTTOM OF EXPLORATION AT 5.8 FEET	

COMPLETION DEPTH: 5.8' DEPTH TO WATER: NOT ENCOUNTERED

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: PROPOSED MAINEDOT FLEET SERVICES / ALLIED ENGINEERING, INC.
PROJECT NO.: 13-0520
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
SWC REP.: AAS
BACKHOE FIRM: LANDWORKS EXCAVATION, LLC
OPERATOR: PAUL BERNIER

TEST PIT TP-5

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.4'	FOREST DUFF	
		1.5'	BROWN SILTY SAND	
		6.0'	TAN FINE SAND, TRACE SILT	
		10.0'	TAN SANDY SILT	
		13.0'	GRAY SILTY CLAY	
			BOTTOM OF EXPLORATION AT 13.0 FEET	

COMPLETION DEPTH: 13.0' DEPTH TO WATER: 5.0'

TEST PIT TP-6

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION:

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.4'	FOREST DUFF	
		1.5'	BROWN SILTY SAND	
		8.0'	TAN FINE SAND, TRACE SILT	
		11.5'	TAN SANDY SILT	
		12.0'	BLUE SILTY CLAY, WITH ORGANIC ODOR	
			BOTTOM OF EXPLORATION AT 12.0 FEET	

COMPLETION DEPTH: 12.0' DEPTH TO WATER: 4.5'

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: PROPOSED MAINEDOT FLEET SERVICES / ALLIED ENGINEERING, INC.
PROJECT NO.: 13-0520
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
SWC REP.: AAS
BACKHOE FIRM: LANDWORKS EXCAVATION, LLC
OPERATOR: PAUL BERNIER

TEST PIT TP-7

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.4'	FOREST DUFF	
		1.7'	BROWN SILTY SAND	
		6.0'	TAN FINE SAND, TRACE SILT	
		6.5'	TAN SILTY FINE SAND	
			BOTTOM OF EXPLORATION AT 6.5 FEET	

COMPLETION DEPTH: 6.5' DEPTH TO WATER: NOT ENCOUNTERED

TEST PIT TP-8

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION:

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.4'	FOREST DUFF	
		1.5'	BROWN SILTY SAND	
		8.0'	TAN FINE SAND, TRACE SILT	
		12.5'	TAN SANDY SILT	
		13.0'	BLUE SILTY CLAY, WITH ORGANIC ODOR	
			BOTTOM OF EXPLORATION AT 13.0 FEET	

COMPLETION DEPTH: 12.0' DEPTH TO WATER: 9.0'

S.W.COLE ENGINEERING, INC.

TEST PIT LOGS

PROJECT/CLIENT: PROPOSED MAINEDOT FLEET SERVICES / ALLIED ENGINEERING, INC.
LOCATION: 66 INDUSTRIAL DRIVE / AUGUSTA, ME
BACKHOE FIRM: LANDWORKS EXCAVATION, LLC
OPERATOR: PAUL BERNIER
PROJECT NO.: 13-0520
SWC REP.: AAS

TEST PIT TP-9

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		0.4'	FOREST DUFF	
		2.0'	BROWN SILTY SAND	
		6.0'	TAN FINE SAND, TRACE SILT	
		12.0'	GRAY/BLUE SILTY CLAY	
			BOTTOM OF EXPLORATION AT 12.0 FEET	

COMPLETION DEPTH: 12.0' DEPTH TO WATER: 5.0'

TEST PIT TP-10

DATE: 10/2/2013 SURFACE ELEVATION: LOCATION: SEE SHEET 1

SAMPLE NO.	SAMPLE DEPTH	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		2.0'	DRAINAGE STONE (12" MINUS)	
		3.5'	(PLASTIC MEMBRANE) SILTY SAND (FILL)	
		(5.5')	SILTY SAND WITH ROOTS AND MINOR ORGANICS (FILL)	
		6.5'	(TOP OF FOOTING AT 5.5')	
		7.0'	GRAY SANDY SILT WITH CLAY (BOTTOM OF FOOTING AT 6.5')	
			BOTTOM OF EXPLORATION AT 7.0 FEET	

COMPLETION DEPTH: 7.0' DEPTH TO WATER: 6.7'

KEY TO THE NOTES & SYMBOLS
Test Boring and Test Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q_u	-	unconfined compressive strength, kips/sq. ft. - based on laboratory unconfined compressive test
S_v	-	field vane shear strength, kips/sq. ft.
L_v	-	lab vane shear strength, kips/sq. ft.
q_p	-	unconfined compressive strength, kips/sq. ft. based on pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W_L	-	liquid limit - Atterberg test
W_P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass. RQD is computed from recovered core samples.
γ_T	-	total soil weight
γ_B	-	buoyant soil weight
f	-	fines content (percent by weight passing U.S. No. 200 Sieve)

Description of Proportions:

0 to 5% TRACE
5 to 12% SOME
12 to 35% "Y"
35+% AND

REFUSAL: **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

S.W.COLE ENGINEERING, INC.

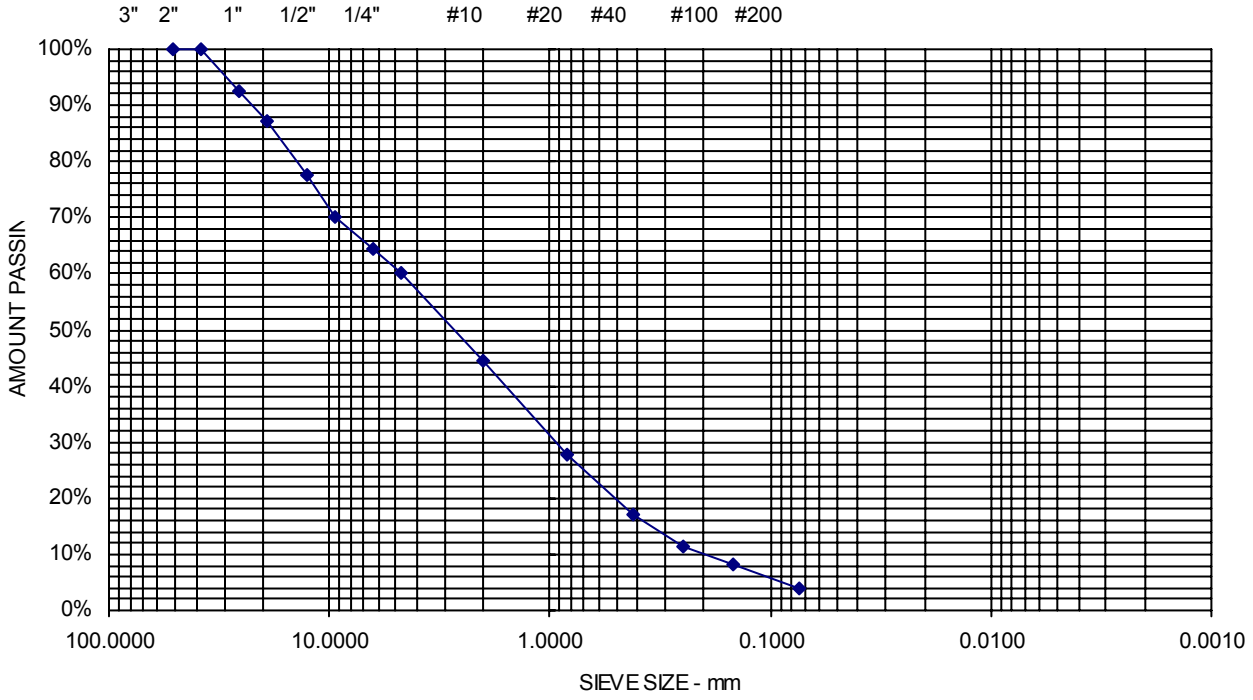
Report of Gradation

ASTM C-117 & C-136

Project Name	AUGUSTA ME - PROPOSED 66 INDUSTRIAL DRIVE DEVELOPMENT - GEOTECHNICAL ENGINEERING SERVICES	Project Number	13-0520
Client	ALLIED ENGINEERING, INC.	Lab ID	7904A
Exploration	**B-1, B-3, B-4 & B**	Date Received	10/9/2013
Material Source	**1D, 0 - 2.2'**	Date Completed	10/11/2013
		Tested By	BRANDON CHAPUT

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**93**	
19.0 mm	**3/4"**	**87**	
12.5 mm	**1/2"**	**78**	
9.5 mm	**3/8"**	**70**	
6.3 mm	**1/4"**	**64**	
4.75 mm	**No. 4**	**60**	39.9% Gravel
2.00 mm	**No. 10**	**44**	
850 um	**No. 20**	**28**	
425 um	**No. 40**	**17**	56.2% Sand
250 um	**No. 60**	**11**	
150 um	**No. 100**	**8**	
75 um	**No. 200**	**3.9**	3.9% Fines

SAND AND GRAVEL, TRACE SILT



Comments:

Sheet 27

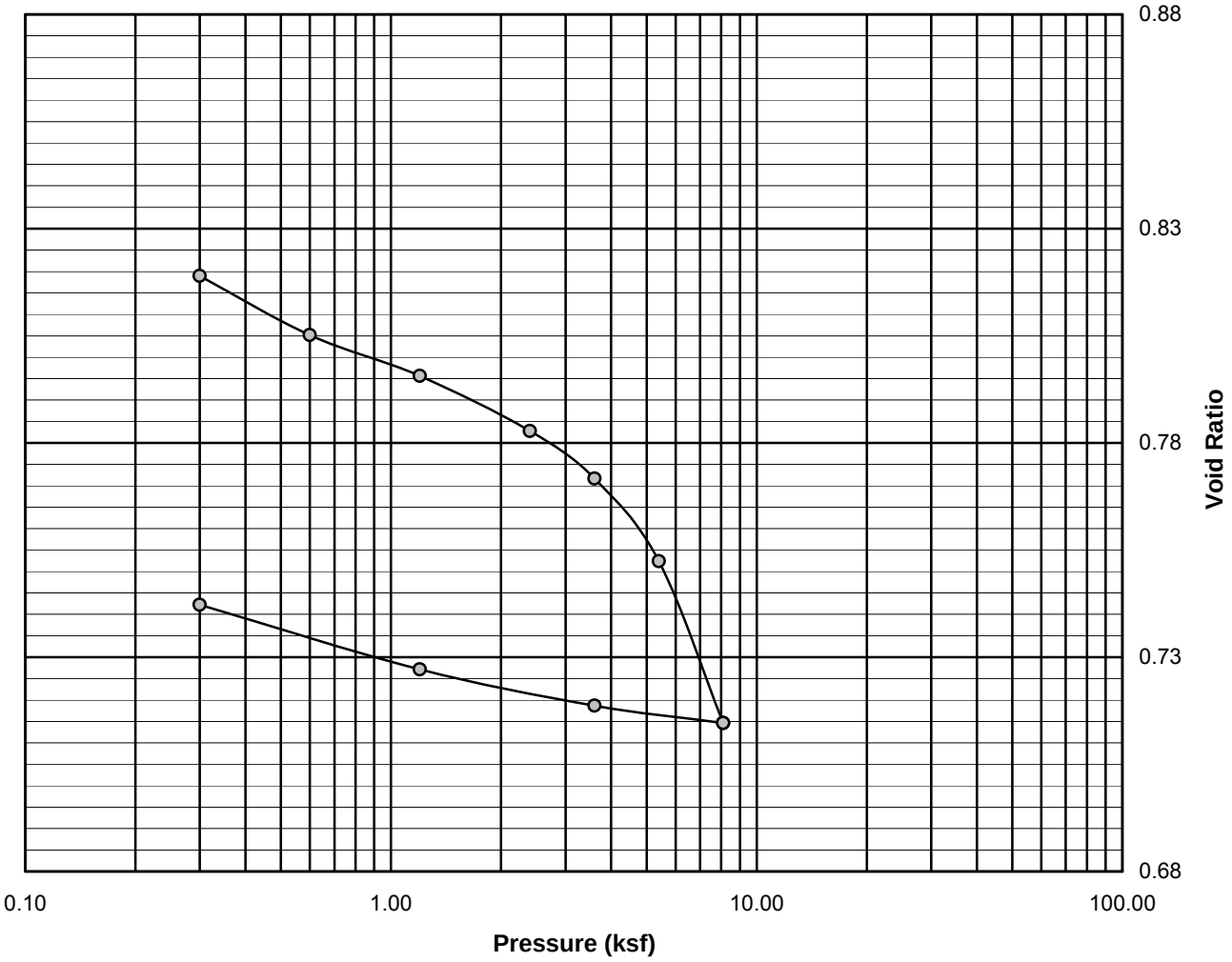
S.W.COLE ENGINEERING, INC.

Consolidation Test

ASTM D-2435

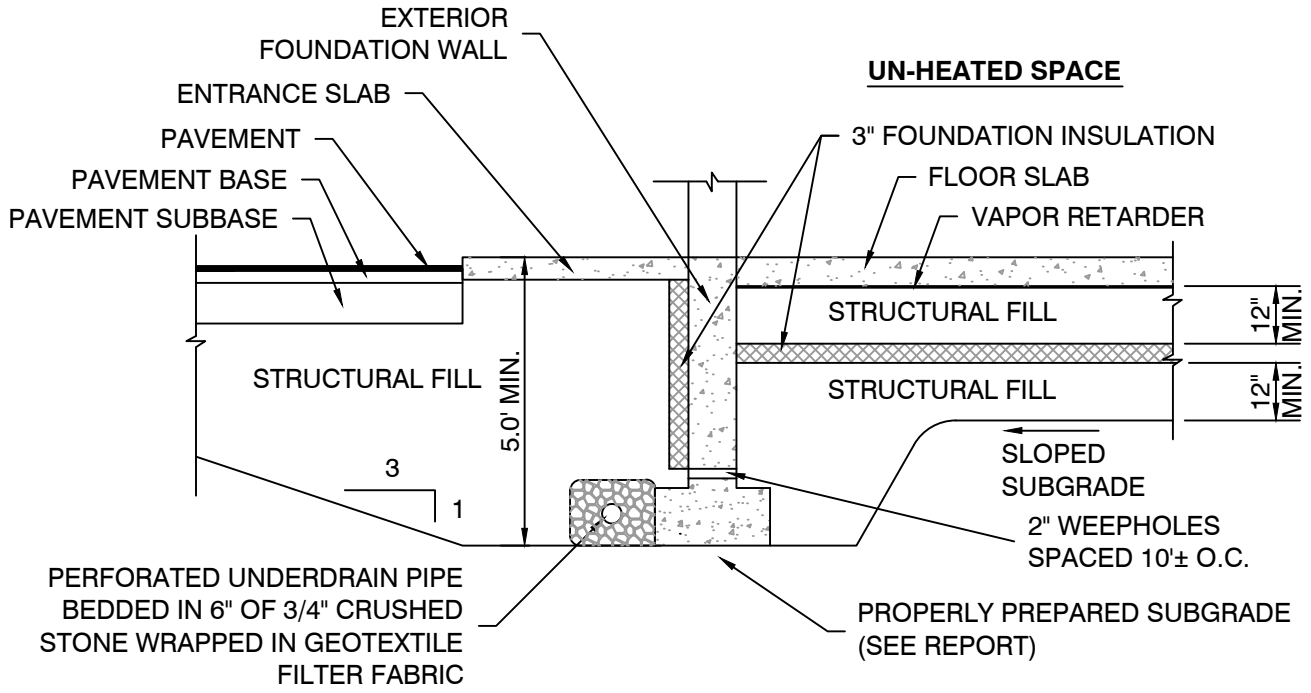
Project Name	MaineDOT BGS Fleet Services	Project Number	13-0520
Client	Allied Engineering, Inc.	Lab ID	16765B
		Date	10/17/2013
Boring	B-14	Date Complete	11/4/2013
Sample	1S		
Depth	15'-17'		

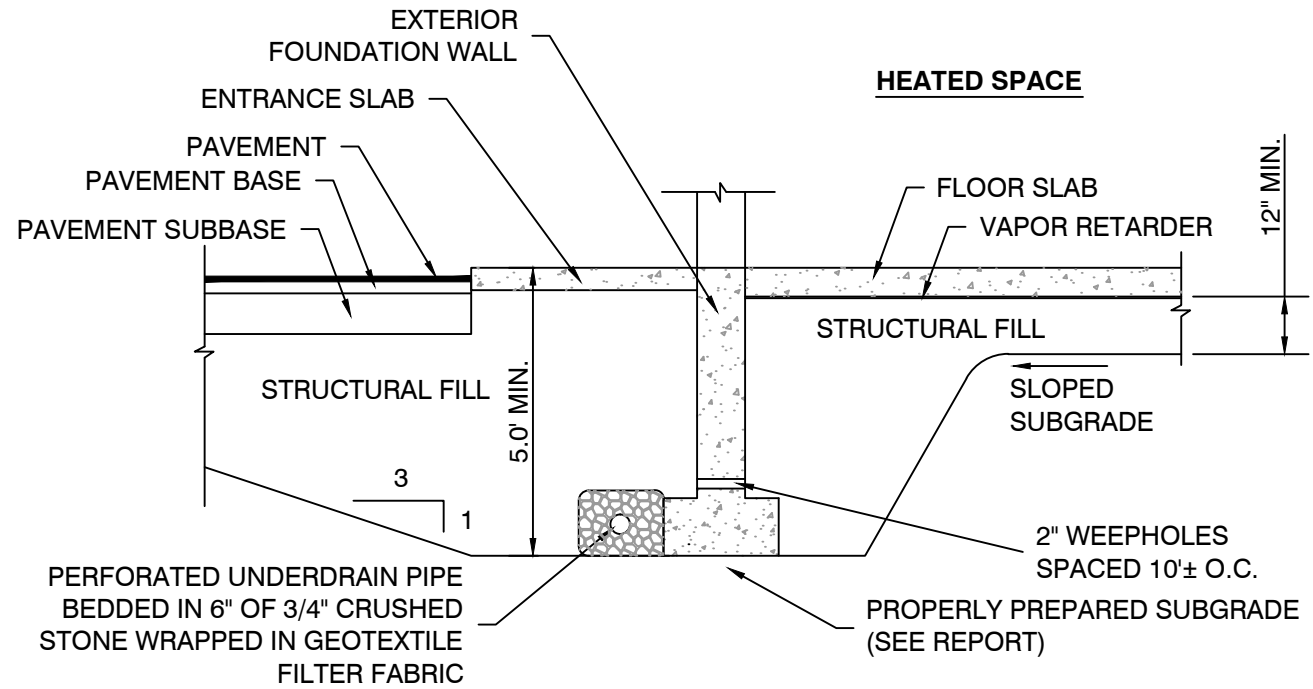
P_C (ksf) =	5.0
C_C =	0.23
C_R =	0.02
w =	31.5%
W_L =	-
W_P =	-



Comments:

Reviewed By





NOTE:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.

2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.

S.W.COLE ENGINEERING, INC.

ALLIED ENGINEERING, INC.

UNDERDRAIN DETAIL

MAINEDOT BGS FLEET SERVICES
66 INDUSTRIAL DRIVE
AUGUSTA, MAINE

Job No.:	13-0520	Scale:	Not to Scale
Date :	11/07/2013	Sheet:	29

R:\2013\13-0520\CAD\Drawings\13-0520 Sheet 29 UD Final.dwg, 11/7/2013 2:04:37 PM, 1:1, CEM, S.W. Cole Engineering, Inc.

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Project Schedule
4. Work by Owner.
5. Owner furnished Products
6. Access to site.
7. Work restrictions
8. Examination of site.
9. Specification and drawing conventions.
10. Drawings Furnished.
11. Contractor’s Duties.
12. Start Date
13. Completion Date

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: 66 Industrial Drive Phase 2

1. Owner WIN #: 020118.20
2. Project Location: 66 Industrial Drive, Augusta, ME.

B. Owner: Maine Department of Transportation.

1. Owner's project manager: Valerie Chiang.

C. Engineer: Allied Engineering, Inc., 160 Veranda St., Portland, ME, 04103; 207.221.2260

D. Engineers Consultants: The Engineer has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Scott Simons Associates, 75 York St, Portland, ME 0410; 207.772.4656
2. Gorrill-Palmer Consulting Engineers, Inc., 15 Shaker Rd, Gray, ME 04039 207.657.6910

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The work as defined in this project manual and the plans. The various items of work for this project are hereinafter specified under the respective branch headings of the work or shown on the accompanying drawings and shall be included in the contracts made for the completion of any respective divisions of the work. Such contracts shall also include necessary details reasonably incidental to the proper execution and completion of such work

B. Summary of work

1. Renovations to existing 60,000 SF pre-engineered metal building

   a. Concrete slab removal for footing placement, replacement and plumbing installations.
   b. Removal of metal siding and roofing, inclusive of building insulation wrap.
   c. Replacement of roofing and siding of existing pre-engineered metal building.
   d. Single and 2-story office construction.

2. Demolition of existing office space.
3. New 2 story 13,441 SF per floor office addition. Office building to be constructed using a braced steel frame superstructure supporting precast concrete plank floor and roof systems.
4. New 7,940 S.F. sign shop pre-engineered building addition.
5. New 5,440 S.F. coatings, paint and wash bay addition constructed using concrete masonry walls and precast concrete roof panels.
6. Work will include GC installation of the following equipment that will be relocated to the 66 Industrial Drive facility MaineDOT but installed by the GC. Equipment is as follows:

   a. <u>Paint Booth/Mix Room, Paint Booth/Mix Room Makeup Air Unit, Paint Booth/Mix Room Exhaust Fans (three total), all associated controls, and Paint Booth/Mix Room Fire Protection System</u>

      MAINEDOT will be responsible for moving all this equipment to the new job site, placing in its final location, and employing the services of a vendor to startup and certify the equipment.

      The GC will be responsible for converting the makeup air unit from LP to Natural Gas, furnish and install all ductwork associated with the fans and make-up air unit, electrical equipment terminations, gas pipe terminations, and TAB.

   b. <u>Blast Area Dust Collector and associated controls, Media Recovery Conveyance and Collection System and associated controls, Exhaust Baffles, and Transfer Louvers</u>

MAINEDOT will be responsible for moving all this equipment to the new job site, placing in its final location, and employing the services of a vendor to startup and certify the equipment.

The GC will be responsible to furnish and install all ductwork associated with the dust collector, re-circulated air, and transfer air, electrical equipment terminations, and TAB. GC will be responsible for modifying the size of the exhaust baffles to accommodate the space requirements.

c. 100 HP Air Compressor, 1,000 Gallon Receiver Tank, Refrigerated Air Dryer, Oil Separator, Filters, and all associated controls

MAINEDOT will relocate to the project site.

GC will install the equipment, provide all electrical and piping connections, perform start-up, and commission the equipment at its new location.

d. Blast Prep Furnace

MAINEDOT will relocate to the project site.

GC will install the equipment, provide all electrical and piping connections, provide new burner to convert from #2 fuel to natural gas, provide flue vent through roof perform start-up, and commission the equipment at its new location.

e. Welding Exhaust Fan, VFD, Extraction Arms, and associated controls

MAINEDOT will relocate to the project site.

GC will install the equipment, provide all supplemental ductwork, electrical and piping connections, perform start-up, and commission the equipment at its new location.

f. Fab Shop Compressed Air Hose Reels

MAINEDOT will relocate to the project site.

GC will install the equipment at the project site.

g. Oil Fired Pressure Washer and Supply Hose

MAINEDOT will relocate to the project site.

GC will install the equipment at the project site, provide a new burner to convert from #2 fuel to natural gas, provide new flue vent through roof, provide electrical and controls service and terminations, provide start-up and commission the unit. Also, provide and install wall sleeves for routing the owner supplied supply hose.

h. Quincy 25 HP Air Compressor and Atlas Copco 10 HP Recip Compressor

MAINEDOT will relocate to the project site.

GC will install at the project site, furnish and install new ancillary equipment, provide all wiring, piping, and controls, provide start-up, and commission the equipment.

i. Exhaust Fan and Stainless Vent Piping for the Engine Washer

MAINEDOT will relocate to the project site.

GC will install the equipment and ductwork, wire the fan, provide TAB, start-up, and commissioning.

j. Small Sawdust Collector for Band saw

MDOT relocates it to the project site, along with the band saw. **GC** powers it up.

k. Small Dust Collector for Sandblaster

MDOT relocates it to the project site, along with the sandblaster. **GC** powers it up and installs duct up to house exhaust.

7. Construction of a 7,084 SF wood framed MaineDOT Fleet Storage Building on the South lot.

8. Utilities

a. Electrical service entrances.
b. Telephone Entrances
c. Data entrances.
d. Sewer entrance.
e. Water / sprinkler entrance.
f. Natural gas entrances.

9. Site work includes:

a. Excavating and back filling at additions for foundations and utility tie-ins within 10 feet of building footprints.
b. Grading with in 10 feet of all additions
c. Excavation and back fill for MaineDOT Fleet Storage Building on south lot.

C. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 Project Schedule

A. The Work under this contract shall be conducted with the following completion milestones:

1. Existing pre-engineered building: (Completion prior to August 1, 2014, unless noted otherwise)

a. Fabrication (Rooms 180 and 181) and Heavy Vehicle Service (Room 160) shall be complete and ready for turnover to the Owner no later than August 1, 2014. Owner needs full month of August to move equipment from various facilities into these spaces. This Work shall include at a minimum the following:

1) Reroofing complete for the entire existing roof system.
2) Removal/reapplication of exterior wall finishes for the entire existing building.

3) Floor to ceiling partitions separating Fabrication (Rooms 180 and 181) and Heavy Vehicle Service (Room 160), and all party walls between office and travel lanes.
4) All framing and plywood scheduled for the exterior walls of the shop areas.
5) All exterior overhead doors and overhead doors scheduled for access to perimeter additions, as well as hollow metal pass doors.
6) All work associated with floor slabs, trench drains, footing replacements, and/or new footing slab modifications.
7) All crane columns and crane supports in the shop bays.
8) GC has between August 1 and August 15, 2014 to install MaineDOT supplied welding exhaust system arm assemblies and exhaust fan with VFD. Coordination will be necessary with MaineDOT as they will be dismantling and transporting these particular assemblies from their Augusta facility no earlier than August 1, 2014. System shall up and running Sept 1, 2014. Complete TAB by October 1, 2014.
9) All necessary Mechanical, Electrical, Power and Fire Protection supply and distribution as specified for these areas.

2. New Coatings addition: (Completion prior to August 1, 2014, unless noted otherwise)

a. Blast Room 194, Dust 195, and Mechanical 196 schedule as follows:

1) GC will be constructing the auger pits integral with the foundations and floor slab. However this installation will require metal diverter inserts for the augers which will be provided by MAINEDOT contracted vendor. Contractor to coordinate with the owner to schedule and receive all required metal diverters for installation. MAINEDOT is responsible for removal, transport and assembly of the remaining associated hardware and equipment as required.
2) MAINEDOT contracts direct with vendor and directly purchases pit sleeves and any supplemental equipment necessary to support connection pit sleeve installations prior to August 1, 2014. Augers and other blast room equipment to be relocated to this site between August 1 and August 15, 2014.
3) MAINEDOT's contracted vendor relocates and installs, and commissions start-up for the Media Recovery System, the Dust Collection Systems and Materials transfer systems with associated equipment into the space between August 1 and August 15, 2014.
4) MAINEDOT applies the 1/2" floor plating to Blast Floor after August 15, 2014.
5) GC will remove, store and install the existing complete 4 ton crane assembly/support structure from the existing space to the new space between August 1 and August 15, 2014.

b. Paint/Prep Rooms 192/193 schedule as follows:

1) MAINEDOT contracts with paint booth vendor to dismantle, move and reinstall paint booth and support systems, including connection of all required power/H&V/Fire Protection systems between August 1 and August 15, 2014.
2) GC completes electrical rough-in, and terminates duct connections, and places fans and makeup air unit subsequent to placement at the site by MAINEDOT vendor.
3) GC completes TAB in conjunction with MAINEDOT vendor start-up prior to September 1, 2014.
4) MAINEDOT will be responsible for removing Prep area furnace from existing building and storing this unit at the new facility. GC to install this unit on the proposed mezzanine over the mixing room, convert to natural gas, start up and conduct TAB procedures as well as all necessary connections to GC installed systems between August 1 and August 15, 2014

c. Wash 191 schedules as follows:

1) Space shall be available for turnover on September 1, 2014.
2) MAINEDOT contracts for moving the steam cleaner into the new space between August 1 and August 15, 2014. GC will pipe and power at new location and have unit operational by September 1, 2014.

3. Remainder of the existing pre-engineered office space build-out, 2-story office addition, and the sign shop addition shall be complete and ready for turnover to the Owner no later than October 1, 2014.

4. MaineDOT Fleet Storage Building shall be complete and ready for turnover to the Owner no later than October 1, 2014.

B. Before commencing Work of each phase, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates for all phases of the Work.

1.6 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1. Phase 1 (By separate contract) will be well under way by the start of this phase work shall consist of:

a. Demolition and earthwork extends up to the face of existing buildings.
b. Utility work extends to within 10 feet of existing and proposed buildings.

1.7 ACCESS TO SITE

A. General: Contractor's use of Project site is limited by Owner's right to perform work or to retain other contractors on portions of Project.

1.8 Work Restrictions:

A. On-Site Work Hours: allowable work times will be in accordance with State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, Section 107 “TIME” and Supplemental Specification (Corrections, Additions, & Revisions to Standard Specifications - Revision of December 2002).

B. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

1.9 EXAMINATION OF THE SITE

A. All Contractors' submitting proposals for the work shall first examine the site and all conditions thereon. All proposals shall take into consideration all such conditions as may affect the work under this contract.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.11 DRAWINGS FURNISHED

A. On the award of the contract, the Department will issue to the Contractor 3 sets of the "Contract Drawings and Specifications" for use in his office and on the job. The owner will also furnish such additional copies as may be required for submission to public authorities to accompany applications for permits

B. Additional copies of drawings and specifications will be issued at cost of reproduction.

C. It is the intention that these specifications and the drawings accompanying same shall provide for this Project to be completed in all its respective parts. Any work shown on the drawings and not particularly described in the specifications, or vice versa, shall be furnished by the Contractor as part of his contract.

1.12 CONTRACTORS DUTIES

A. Asbestos-Free Materials: Contractor shall provide certification that all materials used for construction under this contract are 100% asbestos-free. Refer to Section 01340 – Shop Drawings, Product Data and Samples for submittals.

B. Except as specifically noted, provide and pay for:

1. Labor, materials and equipment.
2. Tools, construction equipment and machinery
3. Water, heat and utilities required for construction
4. Other facilities and services necessary for proper execution and completion of work

C. Secure and pay for all permits, government fees, and licenses that are applicable at the time of bid for proper execution and completion of the work

D. Promptly submit written notice to the Engineer of observed variance of Contract Documents from legal requirements.

1. Appropriate Modifications to Contract Documents will adjust necessary changes to comply with Codes and Regulations.
2. Assume responsibility for work known to be contrary to such requirements without notice

E. Enforce strict discipline and good order among employees. Do not employ unfit persons not skilled in assigned task.

F. Contractor's employees shall not transport, drink, or have in their possession on the job site any intoxicating beverage. Possession of any controlled substances without a physician's prescription is also prohibited. Any Contractor's employee appearing to be under the influence of an intoxicating beverage or narcotics will be escorted off the property and turned over to a competent escort as determined by the Engineer's Representative. Any vehicle found to contain controlled substances or controlled substance residue will be reported to the State Police for investigation.

G. Use or possession of firearms, ammunition and/or explosives is prohibited. Where explosives are required due to construction requirements, specific handling requirements and approvals are required.

1.13 START DATE: Shop drawings and submittals may commence upon entering a contract with the Owner. The contractor may start work as soon as the contract is fully executed and all submittals required to start the project are in accordance with the following requirements:.

A. REQUIRED PRE-CONSTRUCTION AND OTHER EARLY SUBMITTALS

1. 104.4.2 Preconstruction Conference After the Contract has been executed and before the start of on-site construction by the Contractor, the Project Manager and/or the Resident will schedule a preconstruction conference that must be attended by the Superintendent.
2. Pre-Construction Submittals

a. Emergency Contact List - 105.2.2 -
b. Traffic Control Plan (if required) - 652
c. Certification of Installation of Initial Traffic Controls (if required)
d. Schedule of Work - 107.4.2
e. Soil Erosion and Water Pollution Control Plan - 656
f. Certification of Installation of Initial Erosion Controls - 656.4.2
g. Required Jobsite Posters Displayed
h. Notice to Labor Sources 105.10.2 Requirements Applicable to All Contracts C. EEO Notice to Labor Sources

3. Other timely Submittals

a. Subcontractor's List and Certifications - 104.5.3

b. Quality Control Plan - 106.4
c. Projected Payment Schedule - 107.4.3

4. Emergency Contact List; The Contractor shall provide the Resident with and post and maintain in conspicuous places within the Project Limits, a list containing (A) emergency response numbers with the names and telephone numbers (including cellular phone and pager numbers, if applicable) of local ambulance, police, fire, rescue, and hospitals, (B) emergency response numbers for hazardous Materials spills as required by Section 656.3.4(f) - Spill Prevention, (C) the Contractor's personnel with phone numbers who may be reached in case of emergency, and (D) the Department's personnel with phone numbers who may be reached in case of emergency. 105.2.2 Project Specific Emergency Planning
5. Schedule of Work Within 21 Days of Contract Execution and before beginning any on-site activities, the Contractor shall provide the Department with its Schedule of Work in a Critical Path Method (CPM) in the form of an activity on node (AON) diagram. 107.4.2 Schedule of Work Required
6. Soil Erosion and Water Pollution Control The Contractor shall prepare and submit a Soil Erosion and Water Pollution Control Plan (SEWPCP) and properly implement its approved SEWPCP. The Contractor shall have its SEWPCP approved, perform a preconstruction field review, and install and certify initial controls before commencing any Work, which could disturb soils or impact water quality. Within 21 calendar days of Contract Execution, the Contractor must submit its SEWPCP. 656

   a. 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 and shall provide the MaineDOT with their numbers (telephone number, cellular phone and pager numbers, if applicable) where the Environmental Coordinator can be reached 24 hours a day.
   b. If the Work includes the handling or storage of petroleum products or Hazardous Materials including the onsite fueling of Equipment, the Resident must be provided with a Spill Prevention Control and Countermeasure Plan (SPCCP) plan.

7. Notice to Labor Sources Contractors and Subcontractors engaged in Work on this Project must notify each union and/or the Maine Department of Labor Career Center Job Service Centers from which the Contractor intends to obtain labor, and pledge to provide equal employment opportunities without regard to race, color, religion, sex, national origin, or disability. 105.10.2 Requirements Applicable to All Contracts C. EEO Notice to Labor Sources.
8. Subcontract Approvals Within 21 Days of Contract Execution and before any Work is performed by a Subcontractor, the Contractor shall provide the Department a list of all Subcontractors that the Contractor anticipates will be providing Work within the Project Limits and a general description of the items of Work that will be performed by each Subcontractor. Requests for Subcontracts and Lower tier Subcontracts, subcontract agreements, and certifications must be submitted and accepted prior to the subcontractor beginning work on the project. Section 104.5 Subcontracting and Section 105.10 Equal Opportunity and Civil Rights.
9. Quality Control Plan Within 21 Days of Contract Execution or at least 30 days before any related work is to be performed, the Contractor shall its QCP to the Department. 106.4 Quality Control.
10. Projected Payment Schedule Within 21 Days of Contract Execution, the Contractor shall also provide the Department with a Projected Payment Schedule that estimates the value of the Work as scheduled, including requests for payment of Delivered Materials. The Projected Payment Schedule must be in accordance with the Contractor's Schedule of Work and prices submitted by the Contractor's Bid. The Contractor shall revise the Projected Payment Schedule to reflect the actual progress of the Work. 107.4.3 Projected Payment.

1.14 COMPLETION DATE: Refer to Item 1.5 above.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump-sum allowances.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise the Department of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Department's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP-SUM UNIT-COST ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials included under the allowance and shall include taxes, freight, and delivery to Project site.

1.7 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
2. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
3. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

A. Pay Item 999.006 Allowance No. 1 – $25,000: Carry in the base bid Central Maine Power Company utility construction charges for electric services as specified in Division 26 Section "BASIC ELECTRICAL REQUIREMENTS"

B. Pay Item 999.007 Allowance No. 2 - $10,000: TEL DATA Carry in the base bid utility construction charges for Telephone and internet services as specified in Division 26 Section "BASIC ELECTRICAL REQUIREMENTS"

C. Pay Item 999.008 Allowance No. 3 - $1,200: Carry in the base bid for sanitary sewer testing & inspections by Augusta Utility District.

D. Pay Item 999.009 Allowance No. - $1,450: Carry in the base bid for water entrance flushing, testing & inspections by Augusta Utility District.

END OF SECTION 01 21 00

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SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 01 21 00 "Allowances" for products selected under an allowance.
2. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Departments Action: If necessary, the Department will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Department will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Department does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Department will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, department will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Department will consider requests for substitution if received within 30 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Department.

1. Conditions: Department will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Department will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Department for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1. The more stringent of this section or the State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, section 109 CHANGES shall apply.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue through the Owner, supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on, "Architect's Supplemental Instructions Form."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect through the Owner will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by the Architect and or the Owner are not instructions either to stop work in progress or to execute the proposed change.
2. Within 14 days or as indicated in the proposal request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the Engineer through the Department.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: For Change Order proposals use standard forms and number the Request For Proposals (RFP) in alpha numerical order that they are submitted. (RFP#xx)

1.5 CHANGE ORDER PROCEDURES

A. Change proposal shall be handled as outlined in State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any revisions thereto, per section 109 - Changes..

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 DEFINITIONS

A. Completion of Physical Work occurs when the Work is complete and has undergone a successful final inspection. Liquidated Damages will cease upon the physical completion of the Work. The Department will notify the Contractor in writing that the Physical Work is Complete and in Conformity with the Contract and that the Project will be finally accepted when the Closeout Documentation is received from the Contractor.

B. Completion occurs when the Contractor has finished all Work pursuant to the Contract, including Delivery of all Closeout Documentation. The Department will make Final Payment, including the release of all remaining retainage when the Contractor has finished all Work pursuant to the Contract, the Work is complete and has undergone a successful final inspection and delivered documentation, including Closeout Documentation, is complete and accepted. Completion does not mean substantial Completion. Completion also does not mean Completion of Physical Work.

C. Department: The Department of Transportation of the State of Maine, as established by 23MRSA 4202 et seq. for the administration of Highway, Bridge and other public works; acting through the commissioner and his/her duly authorized representatives. For related provisions, see definitions of Project Manager, and Resident

D. Project Manager: The department's duly authorized representative for the overall coordination of the project

E. Resident: The department's on-site representative.

F. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.
   c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to the Department at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Sub schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub schedules showing values coordinated with each phase of payment.
4. Sub schedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide sub schedules showing values coordinated with each element.
5. Sub schedules for Separate Design Contracts: Where the Department has retained design professionals under separate contracts who will each provide certification of payment requests, provide sub schedules showing values coordinated with the scope of each design services contract as described in Section 01 10 00 "Summary."

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

   a. Project name and location.
   b. State WIN #
   c. Name of Engineer.
   d. Engineer's project number.
   e. Contractor's name and address.
   f. Date of submittal.

2. Arrange schedule of values consistent with format of the AIA pay request form.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Percentage complete.

1) Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated based on the percent complete to one decimal point (such as 7.5%)

h. Each line item shall be broken into the following, as a percentage of the line item to nearest one-hundredth percent, adjusted to total 100 percent.

1) Labor.
2) Materials.
3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

5. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments.

1. Initial Application for Payment, Application for Payment at time of Completion of physical work, and final Application for Payment involve additional requirements.

B. Payment Application Times: Submit Application for Payment to the Department by a mutually agreed upon time of the month. The period covered by each Application for Payment is one month, ending on the agreed upon time

1. Submit draft copy of Application for Payment seven days prior to due date for review by the Department.

C. Application for Payment Forms: Use AIA G702 cover sheet and G703 continuation sheets, or form as required by the Department, as form for Applications for Payment.

D. Application Preparation: Complete every entry on form, executed by a person authorized to sign legal documents on behalf of Contractor.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit electronic signed copies of each Application for Payment to the Department.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to the Department.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).

5. Submittal schedule (preliminary if not final).
6. List of Contractor's staff assignments.
7. List of Contractor's principal consultants.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.

I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, as required in the Maine DOT Standard Specifications Section 101.2"Closeout Documentation", including but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Transfer of all utility billing.
4. Updated final statement, accounting for final changes to the Contract Sum.
5. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
6. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
7. AIA Document G707, "Consent of Surety to Final Payment."
8. Evidence that claims have been settled.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

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SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Administrative and supervisory personnel.
3. Requests for Information (RFIs).
4. Project meetings.

1.3 DEFINITIONS

A. RFI: **R**equest **F**or **I**nformation, Request from Department, Architect, or Contractor seeking information from each other during construction. The RFI procedure is used in cases where it is necessary to confirm the interpretation of a detail, specification or note on the construction drawings or to secure a documented directive or clarification from the architect or client that is needed to continue work.

1.4 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
   a. Coordinate with phase 1 site work contractors schedule
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Startup and adjustment of systems.
8. Project closeout activities.

1.5 KEY PERSONNEL

A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified. All RFI's shall be submitted to the Owner's Representative/ resident for distribution.

1. Department will return RFIs submitted by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. State WIN Number.
4. Date.
5. Name of Contractor.
6. Name of Architect.
7. RFI number, numbered sequentially.
8. RFI subject.
9. Specification Section number and title and related paragraphs, as appropriate.
10. Drawing number and detail references, as appropriate.
11. Field dimensions and conditions, as appropriate.

12. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
13. Contractor's signature.
14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716 or Software-generated form with substantially the same content as indicated above, acceptable to the Department.

1. RFIs sent electronically shall be in a Text document format that will allow a response to be inserted.

D. Department Action: Department or Architect will review each RFI, determine action required, and respond. Allow seven working days for response for each RFI. RFIs received by Department after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for coordination information already indicated in the Contract Documents.
    d. Requests for adjustments in the Contract Time or the Contract Sum.
    e. Requests for interpretation of Architect's actions on submittals.
    f. Incomplete RFIs or inaccurately prepared RFIs.

2. Department action may include a request for additional information, in which case time for response will date from time of receipt of additional information.
3. Departments action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify the Department and the Architect in writing within 5 days of receipt of the RFI response.

E. On receipt of Departments action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Department and the Architect within 5 days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:

1. Project name.
2. State WIN Number.
3. Name and address of Contractor.
4. Name and address of Architect and Owner.
5. RFI number including RFIs that were dropped and not submitted.
6. RFI description.
7. Date the RFI was submitted.
8. Date Department’s or Architect's response was received.

9. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Owner, and Architect, within three Insert number days of the meeting.

B. Preconstruction Conference: Owner will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner, Architect, and Contractor and will cover the following:

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Lines of communications.
    f. Procedures for processing field decisions and Change Orders.
    g. Procedures for RFIs.
    h. Procedures for testing and inspecting.
    i. Procedures for processing Applications for Payment.
    j. Distribution of the Contract Documents.
    k. Submittal procedures.
    l. Preparation of record documents.
    m. Use of the premises.
    n. Work restrictions.
    o. Working hours.
    p. Owner's occupancy requirements.
    q. Responsibility for temporary facilities and controls.
    r. Procedures for moisture and mold control.
    s. Procedures for disruptions and shutdowns.
    t. Parking availability.
    u. Office, work, and storage areas.
    v. Equipment deliveries and priorities.
    w. First aid.
    x. Security.
    y. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, Owner, and Owner's Commissioning Authority, of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Review of mockups.
    i. Possible conflicts.
    j. Compatibility problems.
    k. Time schedules.
    l. Weather limitations.
    m. Manufacturer's written recommendations.
    n. Warranty requirements.
    o. Compatibility of materials.
    p. Acceptability of substrates.
    q. Temporary facilities and controls.
    r. Space and access limitations.
    s. Regulations of authorities having jurisdiction.
    t. Testing and inspecting requirements.
    u. Installation procedures.
    v. Coordination with other work.
    w. Required performance results.
    x. Protection of adjacent work.
    y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Owner will schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, but prior to the scheduled date of Completion of physical work.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of record documents.
b. Procedures required prior to inspection for Completion of physical work and for final inspection for acceptance.
c. Submittal of written warranties.
d. Requirements for preparing operations and maintenance data.
e. Requirements for demonstration and training.
f. Preparation of Contractor's punch list.
g. Procedures for processing Applications for Payment at Completion of physical work and for final payment.
h. Submittal procedures.
i. Owner's partial occupancy requirements.
j. Installation of Owner's furniture, fixtures, and equipment.
k. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Owner will conduct progress meetings at regular intervals but at least monthly. If critical issues arise meetings may be more frequent at the discretion of the owner.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Owner, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.

16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings as required to maintain the project schedule. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Owner, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Start-up construction schedule.
2. Contractor's construction schedule.
3. Submittal schedule
4. Daily construction reports.
5. Field condition reports.
6. Special reports.

B. Related Sections:

1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
2. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.4 SUBMITTALS

A. Submittals schedule: submit 3 copies of the schedule. Arrange the following data in tabular format:

1. Date for first Submittal.
2. Specification section and title
3. Submittal category (informational or Action)
4. Description of work
5. Subcontractors Name.
6. Scheduled date for Architects approval.

B. Start-up construction schedule.

1. Three copies

C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Three copies

D. Daily Construction Reports: Submit at weekly intervals.

1. Two copies

E. Field Condition Reports: Submit at time of discovery of differing conditions.

1. Three copies

F. Special Reports: Submit at time of unusual event.

1. Three copies

G. Qualification Data: For scheduling consultant.

1. Review and finalize list of construction activities to be included in schedule.
2. Review submittal requirements and procedures.
3. Review procedures for updating schedule.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Submit a schedule of submittals, arranged in chronological order by dates required by the construction schedule. Include time required for review, resubmission, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate submittal schedule with the list of subcontractors, the schedule of values and contractor’s construction schedule.
2. Initial submittal shall be submitted concurrently with the preliminary bar chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the work and those required early due to long lead time for manufacture or fabrication.
3. Final submission shall be submitted concurrently with the first complete submittal of the contractor’s construction schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 45 (forty five) days, unless specifically allowed by Department
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include not less than 15work days for startup and testing.
5. Punch List and Final Completion: Include not more than 30 days for punch list and final completion.

C. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Completion of physical work, and final completion, and the following interim milestones:

1. Site access
2. Building foundation start
3. Power to site.
4. Plumbing rough in under slabs
5. Concrete slab placements
6. Steel erection
7. Roofing start
8. Mechanical equipment Deliveries
9. Equipment startup
10. Testing adjusting & balancing
11. Owner training

D. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

E. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.3 START-UP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit start-up horizontal bar-chart-type construction schedule within 14 days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 45 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Approximate count of personnel at Project site.
3. Equipment at Project site.
4. Material deliveries.
5. High and low temperatures and general weather conditions, including presence of rain or snow.
6. Accidents.
7. Meetings and significant decisions.
8. Unusual events (refer to special reports).
9. Stoppages, delays, shortages, and losses.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change Orders received and implemented.
13. Work Change Directives received and implemented.
14. Services connected and disconnected.

15. Equipment or system tests and startups.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one (1) day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor shall employ skilled personnel with experience in detailed software based scheduling and reporting techniques.

1. Meetings: Scheduling personnel shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Department, and Architect, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

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SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

a. Scheduled date for first submittal.
b. Specification Section number and title.
c. Submittal category: Action; informational.
d. Name of subcontractor.
e. Description of the Work covered.
f. Scheduled date for Engineer's final release or approval.
g. Scheduled date of fabrication.
h. Scheduled dates for purchasing.
i. Scheduled dates for installation.
j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Submittal Process
1. All submittals shall be sent concurrently to :
a. The resident
b. The department project manager
c. The engineer
d. Where required to the commission agent

B. Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor digital data drawing files of the Contract Drawings for use in preparing Shop Drawings, as requested.

a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD 2014.
c. Contractor shall execute a data licensing agreement in the form of an Agreement form provided by the Architect.

d. The cost of drawings furnished shall be by the contractor at the rate of $50.00 per sheet.

C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 14 days for review of each resubmittal.

E. Paper Submittals: for Color charts and samples. All other paper submittals will require the contractor to provide a Pre-addressed label with postage attached. Paper submittals other than color charts and samples will require 2 sets be sent to the Department and 3 sets be sent to the engineer. Place a permanent label or title block on each submittal item for identification. Color charts and samples will require 2 sets with one returned and one retained

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Include the following information for processing and recording action taken:

a. Project name.
b. Date.
c. Name of Engineer.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of subcontractor.
g. Name of supplier.
h. Name of manufacturer.
i. Submittal number or other unique identifier, including revision identifier.

1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

j. Number and title of appropriate Specification Section.

k. Drawing number and detail references, as appropriate.
l. Location(s) where product is to be installed, as appropriate.
m. Other necessary identification.
n. Pre-addressed label with postage attached.

4. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will discard submittals received from sources other than Contractor.

a. Transmittal Form for Paper Submittals: Use AIA Document G810 or CSI Form 12.1A, or similar approved form

F. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to the Department**,** containing the following information:

a. Project name.
b. Date.
c. Name and address of Engineer.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of firm or entity that prepared submittal.
g. Names of subcontractor, manufacturer, and supplier.
h. Category and type of submittal.
i. Submittal purpose and description.
j. Specification Section number and title.
k. Specification paragraph number or drawing designation and generic name for each of multiple items.
l. Drawing number and detail references, as appropriate.
m. Location(s) where product is to be installed, as appropriate.
n. Related physical samples submitted directly.
o. Indication of full or partial submittal.
p. Transmittal number, numbered consecutively.
q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.

d. Product name.

G. Options: Identify options requiring selection by Engineer.

H. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
4. When shop drawings and/or submitted data sheets do not meet the product/materials shown or specified, the Engineer will review submissions no more than two (2) times. After the second review the Contractor shall have the cost to review all subsequent submissions reimbursed to the Owner at the Engineers published standard billing rate for personnel involved. Cost shall be deducted from the Contract via a Change Order.

J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals via email as PDF electronic files.

   a. Engineer will return annotated file through the department. Annotate and retain one copy of file as an electronic Project record document file.

2. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Engineer will return two copies.
3. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Engineer will not return copies.
4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

   a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
   b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

    a. PDF electronic file.
    b. 5 paper copies of Product Data unless otherwise indicated. Department will retain 2, Engineer will retain 1 and return two copies.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 24 by 36inches
3. Submit Shop Drawings in the following format:

    a. PDF electronic file.
    b. Three opaque copies of each submittal. Engineer will retain two copies; remainder will be returned.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.
   e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit three sets of Samples. Engineer will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:

    a. PDF electronic file.
    b. Five paper copies of product schedule or list unless otherwise indicated. Department will retain two Engineer will return two copies.

F. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

U. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

V. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

A. General: Submittals that do not bear the contractor’s approval stamp or otherwise incomplete will be returned for resubmittal without review.

B. Engineer will review each submission no more than the initial submission and one revised resubmission, after which the engineer reserves to right to charge the contractor the time required for review of subsequent submission for the same specified product.

C. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action as follows:

CHECKING IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. CONTRACTOR IS RESPONSIBLE FOR QUANTITIES; DIMENSIONS TO BE CONFIRMED AND CORRELATED AT THE JOB SITE; INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESS FOR TECHNIQUES OF CONSTRUCTION; COORDINATION OF THE WORK OF ALL TRADES; AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER. THIS REVIEW DOES NOT MODIFY CONTRACTOR'S DUTY TO COMPLY WITH THE CONTRACT DOCUMENTS.

____REVIEWED
____REVIEWED W/NOTES, ***No Resubmission*** Required
____REVIEWED W/NOTES, ***Resubmission*** *Required*
____NOT ACCEPTABLE

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.

E. Submittals not required by the Contract Documents may be returned by the Engineer without action.

END OF SECTION 01 33 00

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SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

B. SUMMARY

C. Section includes requirements for temporary utilities, support facilities, erosion control, security and protection facilities.

D. Related Sections:

1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owners management team, Architect, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.

C. Water Service: Pay water service use charges for water used by all entities for construction operations.

D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage; including delivery, handling, and storage provisions for materials

subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.

1. Indicate sequencing of work that requires water, such as plastering, and Concrete placement, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Resident Engineers' Field Office: Owner will provide a fields office for the resident including electricity, telephone and internet service.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

D. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

E. Isolation of completed areas: Prevent dust, fumes, and odors from entering areas that have finished installed.

1. Prior to commencing work in areas adjacent to completed areas, isolate the HVAC system in area where work is to be performed in accordance with approved coordination drawings.

a. Disconnect supply and return ductwork in work area from HVAC systems servicing finished areas.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within finished areas using portable dust containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of

high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Install lighting for Project identification sign.

I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one (1) telephone line for each field office.

1. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Architect's office.
e. Engineers' offices.
f. Owner's office.
g. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Completion of physical work.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary parking areas for construction personnel.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

   a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

H. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

K. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Completion of physical work.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Summary."

B. Temporary Erosion and Sedimentation Control:

1. Per State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto.

a. Section 656 Temporary soil erosion and water pollution control
b. Maine DOT Best Management Practices for Erosion and Sediment Controls, lates edition

C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

F. Temporary Fire Protection: Maintain temporary fire-protection protocol to protect against reasonably predictable and controllable fire losses.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

   a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
   b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight hour period. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
   c. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor.

2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Completion of physical work, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Examination
2. Additional Contractor Requirements
3. Preparations
4. Construction layout.
5. Field engineering
6. Installation of the Work.
7. Cutting and patching.
8. Owner installed Products
9. Progress cleaning.
10. Correction of Work.
11. Starting and adjusting.
12. Protection of installed construction.

B. Related Requirements:

1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Division 1 Section "Submittal Procedures" for submitting shop drawings and .
3. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Division 2 “Selected demolition” for demolition requirements

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

B. Selected Demolition: Submit plan describing procedures at least 10 days prior to the time selected Demolition that will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of selected demolition.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when demolition will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that demolition procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

    a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 QUALITY ASSURANCE

A. Selected demolition: Comply with requirements for and limitations on Selected Demolition of construction elements.

1. Structural Elements: When cutting and patching structural elements, shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include but are not limited to the following:

    a. Fire separation assemblies.
    b. Air or smoke barriers.
    c. Fire-suppression systems.
    d. Mechanical systems piping and ducts.
    e. Control systems.
    f. Communication systems.
    g. Fire-detection and -alarm systems.
    h. Electrical wiring systems.

3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 ADDITIONAL CONTRACTOR REQUIREMENTS

A. Soil and Water Pollution Control: The Contractor shall provide written certification to the Architect that an On-site Responsible Party (OSRP) has been trained and is knowledgeable in erosion and sediment control (ECS) through the MDEP's Non-Point Source Training Center, or an equivalent program, or is licensed in the State of Maine as a Professional Engineer, Landscape Architect, or Soil Scientist.

B. Spill Prevention Control and Countermeasure (SPCC) Plan: Any areas where petroleum products, oils or hazardous materials are handled or stored will require a Spill Prevention Control and Countermeasure (SPCC) Plan. The Plan will be submitted to the Owner for review and approval prior to construction. The Plan shall provide the following information at a minimum:

1. Name of person who is responsible for spill prevention;
2. Description of handling or storage location, noting setbacks from water bodies where relevant. Significant sand and gravel aquifers and other sensitive resources must be avoided wherever possible;
3. Description of storage and containment facilities;
4. Description of equipment and/or materials used to prevent discharges (including sorbent materials);
5. Preventative measures to minimize the possibility of a spill; and
6. Contingency plan if spill should occur.

C. The approved plan must be posted at the job site. All personnel working in the area are required to read and be familiar with the plan. Notification of Authority of Hazardous Material Spills:

D. Notification of Authority of Hazardous Material Spills: In addition to MDEP reporting requirements for spills greater than five (5) gallons, the Contractor shall notify the Department for all spills where any stream or water body is threatened. These notification procedures shall be incorporated into the Spill Prevention Control and Countermeasure (SPCC) Plan.

E. Environmental Standards: The project will be performed in accordance with the MDOT Best Management Practices (BMP) latest issue. The Contractor shall fully comply with all erosion and sedimentation control requirements outlined in the BMP's or contained herein. In the event of a conflict between these specifications and other erosion and pollution control laws, rules or regulations of other Federal, State and local agencies, the more restrictive law, rule or regulation shall apply.

3.3 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.4 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.

B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.

1. See paragraph 3.5, C., 1 of this specification section for coordination and establishment of benchmarks.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer

3.5 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of the Department. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to the department before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
   1. Coordinate with Phase 1 contractor for location of Benchmarks shown on Phase 1 drawing C004
   2. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
   3. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
   4. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.6 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
   4. Maintain minimum headroom clearance of 96 inches in occupied spaces and in unoccupied spaces unless otherwise noted

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.7 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

   a. Remove all conductors from abandoned electrical conduits.

6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

   a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
   b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

   a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.8 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.9 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

3.11 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.12 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project Record Documents.
3. Operation and maintenance manuals.
4. Warranties.
5. Instruction of Owner's personnel.
6. Final cleaning.
7. Consent of Surety to final payment
8. Evidence of payment and release of liens

B. Related Sections include the following:
1. Supplementary Conditions for Certificates of Insurance for Products and Completed Operations.
2. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion
3. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.3 FINAL CLEAN UP AND FINISHING

A. Preliminary Procedures: Before requesting inspection, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
3. Prepare and submit Project Record Documents, operation and maintenance manuals.
4. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

5. Make final changeover of permanent locks and deliver keys to Owner. Complete startup testing of systems.
6. Submit test/adjust/balance records.
7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
8. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

1.4 COMPLETION OF PHYSICAL WORK AND FINAL COMPLETION

A. The Contractor will notify the Department in writing that it considers the project complete. As soon as practical thereafter, the Department will inspect the Work. Before requesting final inspection the Contractor shall complete the following:

1. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Completion of Physical Work occurs when the Work is complete and has undergone a successful final inspection. Liquidated Damages will cease upon the physical completion of the Work

1.5 The Department will notify the Contractor in writing that the Physical Work is Complete and in Conformity with the Contract and that the Project will be finally accepted when all remaining documentation is received from the Contractor. For a related provision, see Section, see Standard Specification, Section 107.9 Project Closeout

1.6 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Engineer's reference during normal working hours.

B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.

2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "AS-BUILT DRAWINGS" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

C. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Drawings, where applicable.

D. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:

a. Emergency instructions and procedures.
b. System, subsystem, and equipment descriptions, including operating standards.
c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
d. Description of controls and sequence of operations.
e. Piping diagrams.

2. Maintenance Data:

a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of Installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.
h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.8 WARRANTIES

A. Submittal Time: Submit written warranties prior to requesting final inspection.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner with at least seven days' advance notice.
4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:

1. System design and operational philosophy.
2. Review of documentation.
3. Operations.
4. Adjustments.
5. Troubleshooting.
6. Maintenance.

7. Repair.

3.2 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Completion of physical work:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Remove labels that are not permanent.
j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

k. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
l. Replace parts subject to unusual operating conditions.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction.
p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
q. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

SECTION 01 78 20 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of products, materials, and finishes, systems and equipment.

B. Related Sections include the following:

1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Divisions 2 through 33 Sections for specific operation and maintenance manual requirements for products in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Completion. Include a complete operation and maintenance directory. Architect will return1 copy] of draft and mark whether general scope and content of manual are acceptable.

1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with the same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch, 20-lb/sq. ft. white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in the manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."

G. Comply with Division 1 Section "Closeout Procedures" for the schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 20

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SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

B. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

C. Related Sections:

1. Retain Sections in subparagraphs below that contain requirements Contractor might expect to find in this Section but are specified in other Sections.
2. Section 22 08 00 "Commissioning of Plumbing" for commissioning process activities for Plumbing systems, assemblies, equipment, and components.
3. Section 23 08 00 "Commissioning of HVAC" for commissioning process activities for HVAC&R systems, assemblies, equipment, and components.
4. Section 26 08 01 “Commissioning of Electrical Systems” for commissioning process activities for electrical systems, assemblies, equipment and components.
5. Section 28 08 01 “Commissioning of Electronic Safety and Security Systems” for commissioning process activities for fire systems, assemblies, equipment and components.

1.2 DEFINITIONS

A. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

C. CxA: Commissioning Authority.

D. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.3 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:

1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
2. Representatives of the facility user and operation and maintenance personnel.
3. Architect and engineering design professionals.

1.4 OWNER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and each Contractor for information and use.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

C. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.5 CONTRACTOR'S RESPONSIBILITIES

A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
3. Attend commissioning team meetings as scheduled.
4. Integrate and coordinate commissioning process activities with construction schedule.
5. Review and accept construction checklists provided by the CxA.
6. Complete construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.
7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
8. Complete commissioning process test procedures.

1.6 CxA'S RESPONSIBILITIES

A. Organize and lead the commissioning team.

B. Provide commissioning plan.

C. Convene commissioning team meetings.

D. Provide Project-specific construction checklists and commissioning process test procedures.

E. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.

F. Prepare and maintain the Issues Log.

G. Prepare and maintain completed construction checklist log.

H. Witness systems, assemblies, equipment, and component startup.

I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 91 13

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SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.

2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

B. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
2. Please see attached Building assessment for Mold Contamination dated 11/01/13 and Mold evaluation of roof insulation dated 12/12/13

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Existing utility services will be disconnected under Phase 1 of this project.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, or preconstruction videotapes and templates.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: All existing utility services will be discontinued and replaced as specified under respective spec sections.

1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
2. Disconnect, demolish, and remove fire-suppression systems, electrical, plumbing, and HVAC systems, equipment, and components indicated to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area on-site.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

E. Roofing: 1. Remove existing roof membrane, flashings, copings, insulation and roof accessories down to the Purlins. .

1. See Division 07 Sections for new roofing requirements.

F. Siding: Remove existing siding, flashing, trim and insulation, down to the Girts

1. See division 7 for new siding requirements

G. Metal building framing: where existing metal building at the office is removed reuse components as designated on structural plans.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 02 41 19

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SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section describes Work consisting of furnishing and placing Portland Cement Concrete for structures and incidental construction in accordance with these specifications and Reference materials identified herein, including but not limited to, the following:

1. Footings
2. Foundations
3. Slabs-on-grade
4. Elevated slabs
5. Lightweight topping
6. Vapor Barrier
7. Underslab insulation for radiant heated slabs

B. Work shall be in conformity with the lines, grades, and dimensions shown on the Plans, or established, or for placing concrete fill for foundations where called for on the Plans. Method C as described in MDOT Section 502.1. Method C for testing shall be utilizes and shall conform to the requirements of this specification section and MDOT Section 106 .

C. Related Sections include the following:

1. Division 1 – Waste Management
2. Division 7 – Building Insulation
3. Division 23 – Radiant heating Hydronic piping
4. Division 31 Section "Earthwork" for drainage fills under slabs-on-grade.
5. State of Maine Department of Transportation, “Standard Specifications”, (Listed Reference 1.04G).

    a. Section 106 – Quality.
    b. Section 502 – Structural Concrete
    c. Section 503 – Reinforcing Steel
    d. Section 515 – Structural Coating for Concrete Surfaces
    e. Section 518 – Concrete Repair

f. Division 700 – Materials

1.3 DEFINITIONS

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

B. MDOT SECTION: refers to specified section of the State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto.

1.4 REFERENCES

A. American Concrete Institute (ACI):

1. 117 - Specifications for Tolerances for Concrete Construction and Materials
2. 301 - Specifications for Structural Concrete for Buildings
3. 305R - Hot Weather Concreting
4. 306R - Cold Weather Concreting
5. 309R - Guide for Consolidation of Concrete
6. 315 - Manual of Standard Practice for Detailing Reinforced Concrete
7. 347 - Recommended Practice for Concrete Formwork
8. 318 - Building Code Requirements for Reinforced Concrete
9. 544.1R - State-of-the-Art Report of Fiber Reinforced Concrete
10. 554.2R - Measurement of Properties of Fiber Reinforced Concrete

B. American Society for Testing and Materials (ASTM):

1. A 185 - Welded Steel Wire Fabric for Concrete Reinforcement
2. A 615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
3. C 33 - Concrete Aggregate
4. C 39 - Compressive Strength of Cylindrical Concrete Specimens
5. C 94 - Ready-Mixed Cement
6. C 150 - Portland Cement
7. C 260 - Air-Entraining Admixtures for Concrete
8. C 309 - Liquid Membrane-Forming Compounds for Curing Concrete
9. C 494 - Chemical Admixtures for Concrete
10. C 1018 Standard Test Method for Flexural Toughness and First-Crack Strength of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading)
11. C 1116 - Type III, Sections 4.1.3 and 4.2, and Performance Level I, Toughness Index I5 outlined in Section 21, Note 17, Standard Specification for Fiber-Reinforced Concrete and Shotcrete

C. Federal Specifications (FS):

1. TT-C-800 - Curing Compound, Concrete, for New and Existing Surfaces

D. Concrete Reinforcing Steel Institute (CRSI):

1. CRSI - Manual of Standard Practice and Recommended Practice for Placing Reinforcing Bars (MSP-latest edition)

E. American Welding Society (AWS)

F. Scaffolding and Shoring Institute (SSI):

1. Scaffolding and Shoring Safety Rules

G. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto.

1.5 SUBMITTALS

A. Product Data: Provide for each type of manufactured material and product indicated.

B. Design Mixes: (Reference MDOT Section 50 2. 05 Composition and Proportioning).

1. Concrete shall be composed of a homogeneous mixture of Portland Cement or Portland Cement with Fly Ash, Silica Fume, or Ground Granulated Blast Furnace Slag, fine aggregate, coarse aggregate, water and admixtures proportioned according to these Specifications.
2. All materials shall be approved by the Engineer of Record and the MaineDOT prior to use.
3. The Contractor shall submit a mix design that meets these specifications. Mix designs shall be submitted at least 30 days prior to the first scheduled placement.
4. No concrete shall be deposited on the project until the concrete mix has been approved by the Engineer of Record and the Maine DOT.
5. For each concrete mix, include the following:

   a. Description of individual coarse aggregate stockpiles, original source, bulk specific gravity, absorption, gradation, and alkali silica reactivity test results. A combined coarse aggregate blended gradation shall be provided.
   b. Description of fine aggregate, original source, bulk specific gravity, absorption, colorimetric, gradation and Fineness Modulus (FM).
   c. Description and amount of cement and pozzolanic material.
   d. Target Water/Cement ratio.
   e. Target water content by volume.
   f. Target strength.
   g. Target Air Content, slump and concrete temperature.
   h. Target Concrete Unit Weight.
   i. Type of dosages of air entraining and chemical admixtures.

6. Concrete mix designs shall contain no more than 30% fly ash or 50% slag pozzolan cement replacement, by weight.
7. All mixes shall be designed in accordance with the criteria of this specification section.
8. The Design proportions with the fine aggregates designated as a percent of the total aggregate must be stated in terms of aggregate in a saturated, surface dry condition and the batch weights will be adjusted by the Contractor for the actual moisture of the aggregate at the time of use.
9. No change in the sources or character of the mix ingredients may be made without notice to Engineer of Record and the MaineDOT.

C. Steel Reinforcement Shop Drawings: (Reference MDOT Section 503 – Reinforcing Steel).

1. Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement."
2. Splicing shall be in accordance with Table in Reference MDOT 50 3. 07 – Splicing.
3. Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
4. Welded splices will not be allowed.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials.

F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials and aggregates.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Waterstops.
5. Curing materials.
6. Floor and slab treatments.
7. Bonding agents.
8. Adhesives.
9. Radiant underslab insulation/vapor barrier system
10. Epoxy joint filler.
11. Joint-filler strips.
12. Repair materials.

G. Minutes of Preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the Department of Transportation's "Certificate of Ready Mixed Concrete Production Facilities".
2. Contractor shall provide all concrete material testing and concrete cylinder samples for this project.
3. Owner will be performing additional quality assurance (QA) sample testing on their own as well. Contractor shall coordinate schedule of installations with the Owner to allow ample time for the owner to schedule collection of their samples to allow for Owner QA testing.
4. Contractor should be required to have a field technician on site to add chemicals as required to meet specifications.

C. Source Limitations: Obtain each type or class of Cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

D. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

E. ACI Publications: Comply with the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Preinstallation Conference: The contractor shall conduct conference at Project.

1. Flatwork (interior and exterior slabs) Preinstallation Conference: Conduct conference at Project site to review all details and requirements for the batching, mixing, transporting, placing, finishing, and curing all interior and exterior flatwork operations. Require representatives of each entity directly concerned with flatwork operation to attend, including the following:

a. Contractor and Contractor's superintendent.
b. Ready-mix concrete producer.
c. Flatwork subcontractors.
d. Maine DOT representative.

1.7 TESTING EQUIPMENT

A. Testing Equipment: Contractor shall provide testing equipment and materials as specified for use by MaineDOT resident or their representative, exclusively. Equipment shall be made available one week prior to placing concrete and shall be provided at no additional cost to Owner. Contractor shall replace any equipment that becomes unusable due to normal wear and tear or which is stolen, damaged from other than the Resident’s neglect or mistreatment.

B. Equipment shall include the following items:

1. Pressure Air Meter meeting the requirements of AASHTO T152 (Type B). The air meter shall be functional and bear the calibration certificate issued by a recognized lab and current within a year. Accessories shall include:

a. 9 inch Masonry trowel.
b. On metal scoop 9” long x 5” wide
c. One tamping rod conforming to AASHTO T119
d. One rubber mallet as described in AASHTO T152
e. One Strike off bar, flat straight bar of steel

2. Two pocket dial thermometers 20 degrees F to +200 degrees F with a 1” diameter dial, pointed stem, unbreakable polycarbonate crystal, stainless steel case, stem and bezel. Accuracy to 1% over entire range.
3. Contractor’s rubber tired wheelbarrow.
4. Two D-handle square end shovels 9 ½” wide.
5. Two pair heavy duty, long cuffed rubber gloves
6. Miscellaneous equipment:

a. 16 ounce plastic squeeze bottle
b. 5 gallon bucket
c. Scrub brush
d. Paper towels

e. Folding rule
f. Rubber syringes

7. Small rod – one taming rod conforming to AASHTO T277
8. 10’ straight edge as required.

1.8 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS (Reference MDOT Section 50 2. 10) .

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1, or better.
b. Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
c. Structural 1, B-B, or better, mill oiled and edge sealed.
d. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.

2. Manufactured forming system: metal or other panel system with prior review and approval.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.

2.2 STEEL REINFORCEMENT (Reference MDOT Section 503 – Reinforcing Steel).

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

1. Bars shall be clean and free from rust, scale or coatings that will reduce bond. Reinforcing steel shall be capable of bending 180 degrees and rebending to original shape without fracture.

B. Plain-Steel Wire: ASTM A 82, as drawn.

2.3 REINFORCEMENT ACCESSORIES

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

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

C. Mechanical Couplers, Compression Couplers and Tension Couplers are acceptable. Reference MDOT Section 50 3. 07 – Splicing.

1. Tension couplers shall be capable of developing 1.25 times the theoretical yield strength of the spliced bar in tension. Bolted or wedge-lock type couplers are not permitted.
2. Compression couplers shall be capable of maintaining the sliced bar alignments prior to and during concrete placement.
3. Mechanical couplers using threaded splicers and dowel in combination, requiring a lapped splice with the reinforcing bars shall have a minimum lap splice length as specified in Reference MDOT Section 50 3. 07 – Splicing.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type II. (Reference MDOT Section 70 1. 01) .

B. Aggregate:

1. Fine Aggregate Size: Reference MDOT Section 70 3. 01, AASHTO T21, AASHTO T11 and T127, and ASTM C40.
2. Coarse Aggregate Size: ¾”; Reference MDOT Section 70 3. 02, ASTM D4791, AASHTO T85, and AASHTO T11 and T127.

C. Water: Potable and complying with ASTM C 94. Reference MDOT Section 70 1. 02..

D. Fly Ash: Reference MDOT Section 70 1. 10, and shall conform to chemical and physical properties identified in AASHTO M295, Class F.

E. Silica Fume: Reference MDOT Section 70 1. 12 . Silica fume material for us in Portland Cement shall be one of the products listed on the MaineDOT approved products list.

F. Ground Granulated Blast Furnace Slag: Reference MDOT Section 70 1. 13 and shall conform to chemical and physical properties for mineral admixtures identified in AASHTO M302, Grade 120.

2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: Reference MDOT Section 70 1. 03, AASHTO M154. Sika AER by the Sika Chemical Corp. or approved equal. Products must be on MaineDOT Approved Product List.

C. Water-Reducing Admixture: Reference MDOT Section 70 1. 04, AASHTO M194, Type A. Eucon W12-75 by the Euclid Chemical Corp. "Pozzolith 200N by Master Builders "Plastocrete 161" by the Sika Chemical Corp. or approved equal. Products must be on MaineDOT Approved Product List.

D. Set Retarding Admixtures: Reference MDOT Section 70 1. 05, AASHTO M194, Type B or D. Products must be on MaineDOT Approved Product List.

1. Non –corrosive accelerator shall have long-term test data proving its non-corrosive effect on reinforcing steel.

2.6 WATERSTOPS

A. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete. Parastop II by Paramount Technical Products, Inc. or approved equal.

B. Polyvinylchloride: Reference MDOT Section 70 1. 07, as well as conforms with US Army Corp of Engineers Specification CRD C-572.

2.7 RADIANT UNDERSLAB INSULATION/VAPOR BARRIER SYSTEM

A. 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:

1. Assembled insulation, vapor barrier and PEX tube holding grid panel under interior concrete slabs: the products are available in two sizes for 1/2" & 5/8" PEX tubing and for 3/4" & 1" PEX tubing. Verify PEX tubing size with section "238316 Radiant –Heating Hydronic piping".

a. Crete – Heat LLC
b. EZ Floor, Inc

B. Under Interior Slab on Grade Insulation:

1. Assembled insulation, vapor barrier and PEX tube holding grid panel under concrete slabs:

a. 2 inch floor slab insulation: 1-7/8 inches total thickness with 1 inches of solid EPS foam providing an R-10 and a 25 psi/3600 psf compressive strength rating. Each panel to cover 8 square feet with an integral 10 mil polystyrene film providing a perm rating of .51 perms and a fastener **for 1/2 inch and 5/8 inch PEX tubing**. **(VERIFY WITH RADIAN HEAT SHOP DRAWING PEX TUBING SIZE)** The panels are to have protrusions approximately 2.6 inches in diameter and a height of approximately 0.9 inches. The

protrusions to be aligned in alternating rows 3 inches apart on center to allow for an accurate tube placement on a 3” grid system.

1) Material Properties:

a) Flexural Strength in accordance with ASTM C203-99: Method 1, Procedure A Modified with results as follows: Shell Covered Face in Tension: 240 kPa maximum fiber stress and Exposed EPS Foam Insulation Face in Tension: 457 kPa maximum fiber stress
b) Compressive Resistance in accordance with ASTM C165-00 Modified with results of 56 kPa compressive resistance.
c) Density testing in accordance with ASTM D1622-03 Modified with results as follows: foam 1.646 lb./ft^3, and plastic shell and foam 1.95 lb./ft$^{3.}$
d) Dimensional Stability testing in accordance with ASTM D2126-04 7 day @ -40°C (-40°F) and 7 day @ 70C (158°F), 97% RH.
e) Water Absorption testing in accordance with ASTM C272-01 Modified resulted in .83 % by Volume Absorbed.
f) Water Vapor Permeance testing was done in accordance with ASTM E96-00 Modified, Plastic Shell Facing Humidity resulting in 0.51 perms.

C. Thermal Resistance testing in accordance with ASTM C518 Modified resulting in R10.

2.8 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Deicer Protection (Exterior Concrete): Saltgard as manufactured by Pro So Co, Inc., or approved equal. Products must be on MaineDOT Approved Product List.

2.9 LIQUID FLOOR TREATMENTS

A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ChemMasters; Chemisil Plus.
b. ChemTec Int'l; ChemTec One.
c. Conspec by Dayton Superior; Intraseal.
d. Curecrete Distribution Inc.; Ashford Formula.
e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).

f. Edoco by Dayton Superior; Titan Hard.
g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
h. Kaufman Products, Inc.; SureHard.
i. Meadows, W. R., Inc.; LIQUI-HARD.

2.10 RELATED MATERIALS

A. Perimeter Isolation Joint: 2 lb. density, cross linked polyethylene with removable strip-off equal to ISO-STRIP as manufactured for Century Floors, Topsham, Maine.

B. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240. Products must be on MaineDOT Approved Product List.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy-Bonding Adhesive: A two-component, solvent-free, moisture-insensitive structural epoxy adhesive in compliance with ASTM C 881, Type I and Type II, Grade 2, Class B and C, and shall be Sikadur 32, Hi-Mod by Sika Corp. or approved equal. Products must be on MaineDOT Approved Product List.

E. Doweling Adhesive: A two-component, vinylester blend resin equal to HI HY150 adhesive as manufactured by Hilti Fastening Systems, Tulsa, Oklahoma or approved equal. Products must be on MaineDOT Approved Product List.

F. Deicer Protection (Exterior Concrete): Saltgard as manufactured by Pro So Co, Inc., or approved equal.

G. Floor Control: Control joints shall be saw cut or 1/4" wide soft-cut.

H. Construction Joints: See Drawing Details.

I. Non-Shrink Grout: Premixed compound with non-metallic aggregate, cement, water-reducing and plasticizing agents capable of minimum compression strength of 2,400 lbs. Non-shrink grout shall be "Eucon N-S" (non-metallic) by the Euclid Chemical Co., "Masterflow 713" (non-metallic) by Master Builders, Five Star Grout by U.S. Grout Corp., or approved equal. Products must be on MaineDOT Approved Product List.

2.11 REPAIR MATERIALS

A. Slurry: Slurry shall consist of the same proportions of cement to fine aggregates used in the regular concrete mix (coarse aggregate only omitted) and shall be well mixed with such amount of water as will produce a thick consistency.

B. Dry Pack: Dry pack for cosmetic concrete repairs only shall consist of one part cement to 2-1/2 parts fine aggregate (screen out all materials retained on No. 4 sieve), mixed with a minimum amount of water, in small amounts. The consistency shall be such that when a ball of the mixture is compressed in the hand it will maintain its shape, showing finger marks, but without showing any surface water.

C. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations. Products must be on MaineDOT Approved Product List.

1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

D. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.

1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5700 psi at 28 days when tested according to ASTM C 109/C 109M.

2.12 CONCRETE MIXTURES, GENERAL

A. The Contractor shall submit a mix design that meets these specifications. Mix designs shall be submitted at least 30 days prior to the first scheduled placement.

1. No concrete shall be deposited on the project until the concrete mix has been approved by the Engineer of Record and the MaineDOT.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Silica Fume: 10 percent.
5. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.13 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by MaineDOT, Section 50 2. 05.

1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

C. Footings and Foundation Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3500 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.49.
3. Slump Limit: 5 inches, plus or minus 1 inch.
4. Maximum Aggregate Size: 3/4”
5. Air Content: 5.5-8.5 at point of delivery for 1-inch and 3/4-inch nominal maximum aggregate size.

D. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4,000 psi at 28 days.
2. Minimum Cementitious Materials Content: 540 lb/cu. yd..
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Maximum Aggregate Size: 3/4”
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

E. Elevator Cap Slab : Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3,500 psi at 28 days.
2. Minimum Cementitious Materials Content: 540 lb/cu. yd..
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Maximum Aggregate Size: 3/4”
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
6. Slab Depth: 5” including 3” deck flutes.
7. Reinforcement: 6x6xW2.9 x W2.9 WWM

F. Lightweight Topping: Proportion structural lightweight concrete mixture as follows:

1. Minimum Compressive Strength: 3,500 psi at 28 days.
2. Calculated Equilibrium Unit Weight: 110 lb/cu. ft., plus or minus 3 lb/cu. ft. as determined by ASTM C 567.
3. Slump Limit: 5 inches, plus or minus 1 inch.
4. Maximum Aggregate Size: 3/8”
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

G. Exterior Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Minimum Cementitious Materials Content: 520 lb/cu. yd..
3. Slump Limit: 5 inches, plus or minus 1 inch.
4. Maximum Aggregate Size: 3/4”
5. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

H. All concrete shall contain the specified water-reducing admixture. All slabs placed below 50 degrees F shall contain the specified non-corrosive accelerator. All exterior concrete shall contain an approved air-entraining admixture.

I. All exterior concrete shall have an air content of five percent to seven percent.

J. All exterior concrete subjected to freezing and thawing shall have a maximum water-cement ratio of 0.53. All concrete subjected to deicers shall have a maximum water-cement ratio of 0.45.

K. All mix design, batching, placing, finishing, curing, joint sealing and patching of color conditioned concrete shall be in strict accordance with the manufacturers recommendations

L. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.

M. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.14 FABRICATING REINFORCEMENT

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

2.15 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

B. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information (floor slabs only).

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 and Reference MDOT Section 50 2. 10, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

1. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117. Excessive deflection of forms after concrete is poured shall be sufficient cause for rejection of that portion of concrete and formwork. Excessive deflection will be considered to be that which will produce visible and noticeable waves in the finished concrete.
2. Construct forms so that walls will key into each other at ends unless poured monolithically.

3. Shoring designs shall be prepared under the direct supervision of a licensed Professional Engineer in State of Maine. Designs and calculations sealed by the Maine licensed professional engineer shall be submitted for review prior to on-site erection.

B. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch. (Exposed concrete)
2. Class B, 1/4 inch. (Non-exposed concrete)

C. Construct forms tight enough to prevent loss of concrete mortar.

D. All possible care shall be taken in the formwork to produce surfaces free from honeycomb or other defects.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Schedule the work and notify other trades in time so that provisions for their work in the formwork can be made without delaying progress of the project. Verify that all sleeves, pipes, etc., for electrical, plumbing, heating and ventilation, or other work are installed.

H. Chamfer exterior corners and edges of permanently exposed concrete, where indicated on drawings.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Bolts, rods or other approved devices shall be used for internal ties. They shall be so arranged that when the forms are removed, no metal shall be within 1" of any surface.

L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
1. Reinforcing steel coated with form release agent shall be removed or steam cleaned prior to placement of concrete.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Secure information about and provide for all openings, offsets, recessed nailing blocks, channel chases, anchors, ties, inserts, etc., in the formwork before concrete is poured.
2. Install anchor bolts, accurately located, to elevations required.

a. The setting of all anchor bolts and the grouting for all structural steel base plates shall be included as part of this contract. Bolts and base plates will be furnished under Section 05500 - Metal Fabrications, and Section 13125 – Metal Building Systems.
b. All column base plates, equipment bases, and other locations noted in the structural drawings shall be grouted with the specified non-shrink grout. All exposed grout shall be the specified non-metallic type.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. 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-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.4 SHORES AND RESHORES

A. Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.

B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.4

C. Construction of false work supporting concrete structures shall be composed of members having ample structural section to resist all loads imposed upon them with deformations less than span length/360.

D. Shoring designs shall be prepared under the direct supervision of a licensed Professional Engineer in State of Maine. Designs and calculations sealed by the Maine licensed professional engineer shall be submitted for review prior to on-site erection.

3.5 INSTALLATION OF INSULATION, VAPOR BARRIER AND PEX TUBE HOLDING GRID PANEL UNDER CONCRETE SLABS:

A. Coordinate installation with PEX Tubing layout drawing provided under section 238316 Radiant – Heating Hydronic piping.

B. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. All steel bars and wire shall be of size, gauge and length indicated, accurately bent or formed to shapes detailed or scheduled by experienced shops using methods that will not injure the materials.
2. Steel reinforcing shall not be bent in a manner that will injure the material or the embedding concrete. Bars with kinks or bends not shown on the plans shall not be used. Heating of reinforcement for bending will not be permitted. Bars shall be bent once only (no rebending or straightening allowed) unless shown as such on the drawings.
3. All details of reinforcement not shown or indicated on the drawings or specifically called for in the specifications shall conform to ACI 315.
4. Lap all bars at splices, corners and intersections a minimum based on requirements in Reference MDOT Section 50 3. 07, Minimum Lap Splice table
5. All intersecting concrete walls shall be tied with #4L bars 3'-0" long, bent 18" x 18" spaced 12" on center, outside face only unless otherwise indicated.
6. Splices of reinforcement shall not be made at points of maximum stress. Stagger splices of adjacent bars where possible. All splices and laps at corners and intersections shall be tied with wire at each end.
7. Where obstructions (pipes, conduit, ducts, etc.) prevent the intended placement of reinforcing, provide additional reinforcing as directed by the Resident Engineer or his Representative around the obstruction to match that reinforcing interrupted.
8. Provide additional stirrups, ties, trim bars, etc., as directed around all openings, sleeves, pipes, and conduits, which pass through structural elements.
9. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Coverage of bars (including stirrups and column ties) shall, unless otherwise shown, be as follows:

Footings:	3" soil face, 2" top
Slabs (on grade):	2" soil face, 1-1/2" top face
Slabs (elevated):	1" top and bottom
Beam and Column (piers) :	1-1/2"
Walls:	2" clear to form at exterior

2. Misplaced Reinforcing: If any reinforcing bars are found to be misplaced after concrete has been placed, the Engineer shall be notified immediately and no correction or cutting shall be made without his direction. Misplaced bars shall not be bent or kinked. Any redesign and/or reinforcing required because of misplaced bars shall be at the Contractor's expense.
3. All reinforcing shall be kept separate from soil, pipe, conduit ducts, etc., by approved non-metallic separators.
4. Reinforcement shall not have welded joints unless indicated on the drawings or unless prior approval has been given by the Engineer. Welding shall conform to the requirements of the American Welding Society Structural Welding Code for reinforcing steel D1.4. Field welding shall be performed by AWS certified welders.
5. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.

C. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

D. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

E. Rebar at all intersection shall be wire tied.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Reference MDOT Section 50 2. 11 (E): Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.
2. Space vertical joints in walls as indicated.

   a. Wall control "V" joints shall have a depth of 1/8 times the thickness of the wall and be 1/2" wide at surface. "V" joints shall be placed as shown or as directed by the Engineer.

3. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, or 3/4" minimum for soft-cut as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/4" (maximum) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

   a. Floor slab control joints shall be placed as shown on the foundation plan. Unless otherwise noted, control joints shall be spaced at intervals not to exceed 12'-0" on center in both directions.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, and other locations, as indicated.

1. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.

1. All intersecting slab construction joints acting as control joints shall be doweled according to the following schedule unless otherwise indicated. Dowels shall be smooth, steel grade 60 with saw cut ends. Grease, wrap or cap one end.

Dowel Schedule

	Dowel Dia.	Length	Spacing
5" Slab	5/8"	14"	12"
6" Slab	3/4"	14"	12"
8" Slab	1"	14"	12"

3.8 WATERSTOPS

A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, bonding or mechanically fastening and firmly pressing into place. Install in longest lengths practicable.

1. Remove all protrusions and indentations 2" or over in all areas.
2. Lay waterstop flat against concrete surface and nail every 1" to 6" with case hardened washered nails.
3. Overlap all joints a minimum of 2".

3.9 MIXING CONCRETE

A. General: The concrete shall be mixed in the quantities required for immediate use, and any which has developed initial set or exceed the time limit of ASTM C 94 shall not be used. No re-tempering of mortar or concrete shall be allowed under any circumstances. Concrete shall be proportioned, mixed and placed only in the presence of the Engineer or his Authorized Representative. The Contractor shall give ample notice to the Engineer before mixing is commenced. Aggregate size will be adjusted to suit conditions of work. Pumping of concrete shall be permitted only after approval by the Engineer of the Pumping Contractor and the pumping equipment and method to be employed. The Engineer shall be notified of dates when pumping of concrete shall be performed to permit his on-the-job inspection of the operations.

B. Final proportions shall be in accordance with approved mix designs. Adjustments to approved proportions, for whatever reason, shall be approved by the Engineer.

C. Batching of concrete mix shall be by a MDOT approved plant meeting AASHTO M-157.

3.10 DELIVERY (Reference MDOT Section 50 2. 0701 – Delivery)

A. Delivery and discharge of concrete from the mixer shall be completed within maximum 1 ½ hours from time when cement is added to the aggregate.

1. Exception: in hot weather when mix temperatures exceed 70 degrees F or under other conditions contributing to quick stiffening of the concrete, delivery and discharge from the mixer shall be completed within 1 hour from the time the cement is added to the aggregate. The Resident engineer may approve use of retarding admixtures, increasing the required 1 hour limitation for discharge back up to 1 ½ hours.

B. Concrete temperatures before placement shall not exceed 85 degrees F.

3.11 CONCRETE PLACEMENT (Reference MDOT Section 50 2. 11)

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Remove loose dirt, mud, standing water, and foreign matter from excavations or from cavities.

C. Thoroughly clean reinforcement and other embedded items free from loose rust and other matter. Assure reinforcing is held securely in place.

D. Thoroughly wet wood forms (except coated plywood), bottom and sides of trenches, base underslab, and adjacent concrete or masonry at least one hour in advance of placing concrete; securely close cleanout and inspection ports; repeat wetting as necessary to keep forms damp.

E. Equipment shall be maintained clean and of sufficient quantity and capacity to efficiently execute the work required.

F. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Engineer.

G. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.

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

I. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.

1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.

   a. Concrete shall be vibrated into final position in forms with an internal type vibrating machine. The vibration shall have a frequency of not less than 8,000 vibrations per minute. The mechanical vibrating equipment shall be satisfactory to the Engineer.
   b. The vibration shall be of sufficient intensity and duration to cause flow or settlement of the concrete and complete consolidation. Over vibration, especially of mixtures that are too wet, may cause segregation and will be avoided. A sufficient number of vibrators shall be provided to permit consolidation of each batch before the next batch is delivered and without delaying the delivery.
   c. The vibrations shall be applied directly to the concrete, and vibration through the forms shall not be permitted. Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. The concrete shall be placed in layers of uniform thickness
   d. Dropping of concrete a distance of more than 6 feet unless confined by closed chutes or pipes will not be permitted. The concrete shall be deposited at or as near as possible to its final position.

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

3. When conditions make puddling difficult, or where the reinforcement is congested, batches of mortar containing the same proportions of cement to sand used in the concrete shall be deposited in the forms. The operation of filling with the regularly specified mix shall be carried on at such a rate that the mix is at all times plastic and flows readily into the spaces between the bars.
4. In thin walls or inaccessible portions of the forms where rodding is impractical, the concrete shall be worked into place by tapping or hammering forms adjacent to the freshly deposited concrete.
5. The Contractor's attention is called to the importance of making the concrete dense, and he shall provide sufficient labor to the entire satisfaction of the Engineer to thoroughly consolidate the concrete, avoid air pockets and voids in exposed sections, and leave smooth, uniform surfaces after forms are removed.
6. Should any honeycombed concrete be disclosed upon removal of forms, the Contractor shall immediately cut out the said honeycombed portions back to solid concrete and shall fill the opening thus formed with a concrete of the same proportions as that specified for the section of work in which the fault occurs.
7. When placing fresh concrete upon hardened concrete, the latter shall be thoroughly roughened and cleaned of all loose material, scum or latency. The bonding compound shall be applied and the new concrete placed while the bonding compound is still tacky.
8. Joints in the concrete work shall be made only in places and the manner specified by the Engineer.
9. The Contractor's attention is called to the importance of properly and carefully placing concrete around reinforcement, as the reinforcing metal must not be exposed; and in cases where reinforcing metal becomes exposed on the surface, that portion of work must be removed and re-laid as the covering of same by plastering with cement mortar will not be allowed. All reinforcing rods or other reinforcing material shall be lightly tapped so that they will retain their original position.
10. Wet sticking of dowels and/or anchor bolts shall not be performed.
11. No concrete shall be retempered except as allowed in ASTM C 94 nor shall set concrete be used as aggregate.

J. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.

    a. Reinforcement, unless otherwise indicated, shall be placed one-half the thickness of the slab.

3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
6. In addition to steel bar reinforcement, slabs shall be reinforced with fibrous concrete reinforcement which is to be added when the concrete is being batched in strict accordance with the manufacturer's recommendations.
7. Slabs shall be monolithically placed with control joints. Sawed control joints will be located as indicated on the drawings and/or as directed by the Engineer. Floors shall be cleaned of objects before saw cutting begins. A true, continuous saw cut is what is expected as a finish result.

K. Cold-Weather Placement: Comply with ACI 306.1 and Reference MDOT, Section 50 2. 08. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, discontinue placing concrete until atmospheric temperature is as high as 35 deg. F in the shade and rising.
2. At the direction of the Resident Engineer, the water shall be heated to a temperature not exceeding 180 deg. F.
3. If the Atmospheric temperature is below 25 deg. F, the aggregate shall also be heated when directed by the Resident.
4. When either the water or aggregate is heated to above 120 deg. F, they are to be combined first in the mixer before cement is added.
5. Materials containing frost or lumps of frozen material shall not be used.
6. The temperature of mixed concrete shall be as follows when placed in forms.

   a. Less than 12” forms: 55 – 70 deg. F
   b. Between 12” and 36”: 50 – 70 deg F
   c. Between 36” and 72”: 45 - 70deg F
   d. Greater than 72”: 40 deg. F

7. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
8. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
9. Contractor shall have on the job, ready to install, adequate equipment for heating the materials and the freshly placed concrete and for enclosing the work in accordance with the requirements specified herein.
10. Permission given to place concrete under the conditions mentioned above and as described in the Contractor’s QC Plan shall not relieve the Contractor of responsibility for obtaining satisfactory results. The Contractor shall be wholly responsible for the protection of concrete during cold weather and any concrete injured by frost action or overheating shall be removed/replaced at the Contractor’s expense.

L. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

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

M. Protection:

1. Concrete just placed shall be protected from rain in an approved manner until the concrete has set, or if a slab, the curing compound has dried.
2. Concrete, when placed in the forms, shall have a temperature of not less than 50 degrees F nor more than 90 degrees F. Freshly placed concrete and the surrounding air shall be maintained at a temperature of 50 degrees F or greater for a period of seven days after placing. If high early strength concrete is used, the aforementioned time period may be reduced to three days. The methods of protection and curing shall be such as to prevent evaporation of moisture from the concrete and injury to the surface.
3. Should it later develop that any concrete work has become injured in any way by freezing or otherwise, the defective concrete shall be repaired or replaced as directed by the Engineer at no

added expense to the Owner. Repair materials shall include all reinforcement grouts, dry pack, admixtures, epoxy and aggregates as may be necessary

N. Deicer Protection:

1. Apply deicer protection to all exterior slabs on grade, and related work 30 days after concrete placement in strict accordance with manufacturer=s written recommendations.

3.12 PROTECTIVE COATING FOR STRUCTURAL STEEL

A. All structural steel columns and their bases which extend into or through concrete floors shall be thoroughly brush painted with two coats of Cold Applied, emulsified – asphalt damp proofing,

1. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.
2. VOC Content:30 g/L or less

3.13 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.

1. Apply to concrete surfaces exposed to public view.

C. Rubbed Finish: Apply the following to smooth-formed finished concrete:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. 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.

3.14 FINISHING FLOORS AND SLABS

A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

1. All interior concrete floor slabs shall be finished true and smooth by steel troweling or finishing machine. All exterior slabs shall be broom finished.
2. When a section of the concrete floor is completed, it shall be left entirely undisturbed until the concrete is thoroughly hardened.

3. Adequate provisions will be made to eliminate the possibility of accidental encroachment upon the newly concreted area.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish.

C. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view.
2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:

a. Tolerances will be in accordance with ACI Publication #117 - Class AX. Depression in floor between high spots shall not be greater than 3/16" in 10'-0" ± 1/16", and the measurement will be taken by the straight edge method no later than the day after the concrete floor has been placed.
b. Specified overall values of flatness, F(F) 20; and levelness, F(L) 17

D. Broom Finish: Apply a broom finish to exterior concrete platforms.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

3.15 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

B. Mechanical Equipment Pads: Provide 4" concrete pads reinforced with #3 Bars at 18” O.C. each way under all mechanical equipment supported on concrete floor slab unless otherwise indicated.

C. Foundation Insulation: Install foundation insulation using a dab of emulsified asphalt mastic in each corner and the center to adhere the insulation to the concrete wall. Insulation will be installed on the inside face of all perimeter foundation walls extending from the underside of floor slab to top of footing. Insulation furnished under Section 07200 - Insulation.

3.16 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with State of Maine Department of Transportation, “Standard Specifications,” Revision 2002 section 50 2. 15.

3.17 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until the completion of the project. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid epoxy joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

D. Install isolation joints around columns in accordance with the drawings and manufacturer's recommendations.

E. Install perimeter isolation joints in accordance with the drawings and manufacturer's recommendations.

3.18 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area 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.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.19 FIELD QUALITY CONTROL (Reference MDOT, Section 50 2. 0501 – Quality Control)

A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.

1. The contractor shall be responsible to notify MDOT a minimum of 48 hours prior to all required quality control testing.
2. The MaineDOT will be performing progress sampling of all the site concrete with their own personnel and lab facilities.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Contractor’s Independent Testing Agency:

a. No work shall proceed until Independent Testing Agency through the Contractor, submits a QC plan and that plan has been approved by the Owner. QC plan shall address the following:

1) Mix designs
2) Aggregate Production
3) Quality Components
4) Stockpile Management
5) Proportioning, including added water
6) Mix transportation, including time from batching to completion of delivery
7) Initial and as delivered mix properties, including temperature, air content, consistency and water/cement ratios.
8) Process quality control testing
9) Placement and consolidation
10) Permeability
11) Compressive strength

12) Finishing and curing
13) Hot and cold weather concrete procedures, including curing and form removal

b. All concrete sampling shall be taken at point of discharge of the chute or pump line.

c. Cylinder Test Samples: set of four (4) test cylinders shall be made for each 100 cubic yards, or fraction thereof, of each class of concrete placed each day. Cylinders shall be made and cured by the Testing Agency in accordance with ASTM C 31. The properly marked cylinders shall be picked up by the approved testing agency and tested in accordance with ASTM C 39. The test results will be sent directly to the Engineer with location and date marked. In addition to the date cast, the date and time the cylinders are picked up for transportation to the lab shall be shown.

d. Air content shall be checked at least twice each day on air-entrained concrete in accordance with ASTM C 173 or ASTM C 231.

e. Description of the manner in which cylinders were stored for the first 24 hours and the succeeding 27 days shall also be indicated.

f. Contractor shall provide a Certificate of Compliance and maintain on-site records for each truckload of concrete at the time of placement, which shall include the following:

1) Contract name and Number
2) Manufacturing Plan (Batching Facility)
3) Name of Contractor (Prime)
4) Date
5) Time batched/discharged
6) Truck No.
7) Quantity (Quality batched this load)
8) Designation of concrete type or producer's design mix number
9) Cement brand/type and shipment certification number
10) Temperature of concrete at discharge
11) Target weights (cubic yard) and actual batch weights of:

a) Cement
b) Pozzolanic additives, including fly ash, slag cement and microsilica
c) Coarse aggregate
d) Fine aggregate
e) Water (including free moisture in aggregates and water added at the project)
f) Admixtures brand and quantity (fl. oz./cy)

12) Air entrainment admixtures
13) On-site slump tests
14) Water reducing admixtures
15) Other admixtures
16) Placement location

g. Quality Control Testing is by Contractor through independent Quality Control firm.

h. MaineDOT will be performing their own quality assurance testing at random intervals on the batch deliveries. Any discrepancies discovered through either the Independent testing or Owner QC process shall be addressed per MDOT Section 50 2. 0505 – Resolution of Disputed Acceptance Test Results.

i. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 24 hours of finishing.

C. When strength of field-cured cylinders is less than 80 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

E. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

G. Additional Tests: Contractor's Independent Quality Control and testing subcontractor shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Resident Engineer. Contractor's Independent Quality Control and testing subcontractor may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Resident Engineer.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 03 30 00

SECTION 03 41 00 – PLANT-PRECAST STRUCTURAL CONCRETE

PART 1 - PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide precast structural concrete units and connections capable of withstanding design loads within limits and under conditions indicated.

1.3 SUBMITTALS

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

B. Design Mixes: For each concrete mix.

C. Shop Drawings: Detail fabrication and installation of precast structural concrete units. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, openings, and types of reinforcement, including special reinforcement.

1. Indicate joints, reveals, and extent and location of each surface finish.
2. Indicate separate face and backup mixture locations and thicknesses.
3. Indicate welded connections by AWS standard symbols. Show size, length, and type of each weld.
4. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints.
5. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
6. Include and locate openings larger than by 10 inches.
7. Indicate location of each precast structural concrete unit by same identification mark placed on panel.
8. Indicate relationship of precast structural concrete units to adjacent materials.
9. Indicate estimated camber for precast floor slabs with concrete toppings.
10. Indicate shim sizes and grouting sequence.
11. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

G. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:

H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Concrete materials.
2. Reinforcing materials and prestressing tendons.
3. Admixtures.
4. Bearing pads.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced Installer who has completed precast structural concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm that complies with the following requirements and is experienced in manufacturing precast structural concrete units similar to those indicated for this Project and with a record of successful in-service performance.

1. Assumes responsibility for engineering precast structural concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
2. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of precast structural concrete that are similar to those indicated for this Project in material, design, and extent.
3. Participates in PCI's Plant Certification program and is designated a PCI-certified plant for Group C, Category C2.
4. Has sufficient production capacity to produce required units without delaying the Work.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

D. Calculated Fire Resistance: Where indicated, provide a precast structural concrete unit whose fire resistance has been calculated according to PCI MNL 124, "Design for Fire Resistance of Precast Prestressed Concrete," and is acceptable to authorities having jurisdiction.

E. Fire-Test-Response Characteristics: Provide precast structural concrete units that comply with the following requirements:

1. UL, ITS, or another testing performed fire-response testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
2. Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," from ITS's "Directory of Listed Products," or from the listings of another testing and inspecting agency, are identical in materials and construction to those tested per ASTM E 119.
3. Products are identified with appropriate markings of applicable testing and inspecting agency.

F. Design Standards: Comply with ACI 318 and the design recommendations of PCI MNL 120, "PCI Design Handbook – Precast and Prestressed Concrete".

G. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and camber and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products".

H. Product Options: Drawings indicate size, profiles, and dimensional requirements of precast concrete units and are based on the specific types of units indicated. Other fabricators' precast concrete units complying with requirements may be considered. Refer to Division 1 Section "Substitutions".

I. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code – Steel"; and AWS D1.4, "Structural Welding Code – Reinforcing Steel".

J. Pre-installation Conference: Conduct conference at Project site.

1. Discuss methods for maintaining flush joints for floor leveling.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver precast structural concrete units to Project site in such quantities and at such times to ensure continuity of installation. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and so markings are visible.

B. Lift and support units only at designated lifting and supporting points as shown on Shop Drawings.

1.6 SEQUENCING

A. Furnish anchorage items to be embedded in other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MOLD MATERIALS

A. Molds: Provide molds and, where required, form-facing materials of metal, plastic, wood, or another material that is non-reactive with concrete and dimensionally stable to produce continuous and true precast concrete surfaces within fabrication tolerances and suitable for required finishes.

2.2 REINFORCING MATERIALS

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

B. Plain-Steel Wire: ASTM A 82.

C. Deformed-Steel Welded Wire Fabric: ASTM A 497, flat sheet.

D. Supports: Manufacturer's bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place according to CRSI's "Manual of Standard Practice", PCI MNL 116, and as follows:

1. For uncoated reinforcement, use CRSI Class 1 plastic-protected bar supports.

2.3 PRESTRESSING TENDONS

A. Prestressing Strand: ASTM A 416/A 416M, Grade 250 or 270, uncoated, seven- (7) wire, low-relaxation strand.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, of same type, brand, and source.

B. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5S.

C. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

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

E. Water-Reducing Admixture: ASTM C 494, Type A.

F. Retarding Admixture: ASTM C 494, Type B.

G. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

H. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

I. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.

J. Plasticizing Admixture: ASTM C 1017.

K. Fly Ash Admixture: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.

L. Silica Fume Admixture: ASTM C 1240.

2.5 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished; AWS D1.1, Type A or B, with arc shields.

C. Malleable Steel Castings: ASTM A 47.

D. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.

E. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts; and flat, unhardened steel washers.

F. Shop-Primed Finish: Prepare surfaces of non-galvanized steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3 and shop-apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in FS TT-P-664 according to SSPC-PA 1.

G. Welding Electrodes: Comply with AWS standards.

H. Accessories: Provide clips, hangers, plastic shims, and other accessories required to install precast structural concrete units.

2.6 BEARING PADS

A. Provide bearing pads for precast structural concrete units as follows:

1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, one hundred percent (100%) polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 Shore A durometer, minimum tensile strength 2250 psi per ASTM D 412.

2.7 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144. Mix at ratio of one (1) part cement to two and one-half (2-1/2) parts sand, by volume, with minimum water required for placement and hydration.

2.8 CONCRETE MIXES

A. Prepare design mixes for each type of concrete required.

1. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
2. Limit use of fly ash to 25 percent replacement of portland cement by weight and granulated blast-furnace slag to 40 percent of portland cement by weight; metakaolin and silica fume to 10 percent of portland cement by weight.

B. Design mixes may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

C. Limit water-soluble chloride ions to the maximum percentage by weight of cement permitted by ACI 318.

D. Normal-Weight Concrete: Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (twenty-eight [28] Days): 5000 psi.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows, with a tolerance of plus or minus one and one-half percent (1-1/2%):

   a. Air Content: Six percent (6%) for 1-inch- nominal maximum aggregate size.
   b. Air Content: Six percent (6%) for 3/4-inch- nominal maximum aggregate size.
   c. Air Content: Seven percent (7%) for 1/2-inch- nominal maximum aggregate size.
   d. Air Content: Two and one-half to four and one-half percent (2.5% to 4.5%).

E. Other Admixtures: Use water-reducing, high-range water-reducing, water-reducing and accelerating, or water-reducing and retarding admixtures according to manufacturer's written instructions.

F. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.9 FABRICATION

A. Formwork: Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for pre-tensioning and de-tensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances.

1. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial-formula, form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's written instructions.
2. Unless forms for precast, prestressed concrete units are stripped before de-tensioning, design forms so stresses are not induced in precast concrete units because of deformation or movement of concrete during de-tensioning.

B. Built-in Anchorages: Accurately position built-in anchorage devices and secure to formwork. Locate anchorages where they do not affect position of main reinforcement or concrete placement. Do not relocate bearing plates in units unless approved by Architect.

C. Built-in Pour Stops for Core Ends: Provide built-in pour stops in cores to control and accommodate end panel grouting operations. Provide these pour stops to allow for 16 inches of end grout installation.

D. Cast-in openings larger than 10 inches in diameter or 10 inches square according to Shop Drawings. Smaller holes may be field cut by trades requiring them, as approved by Architect.

E. Reinforcement: Comply with recommendations in CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete-placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required.
3. Place reinforcement to obtain at least the minimum coverage for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one (1) full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

F. Prestress tendons for precast structural concrete units by pre-tensioning methods. Comply with PCI MNL 116.

1. Delay de-tensioning until concrete has reached at least seventy percent (70%) of its compressive strength as established by test cylinders cured under the same conditions as concrete.
2. If concrete has been heat-cured, de-tension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.
3. De-tension pre-tensioned tendons either by gradually releasing tensioning jacks or by heat-cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.

G. Mix concrete according to PCI MNL 116 and requirements in this Section. After concrete batching, no additional water may be added.

H. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units. Comply with requirements in PCI MNL 116 for measuring, mixing, transporting, and placing concrete.

I. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with PCI MNL 116.

J. Comply with ACI 306.1 procedures for cold-weather concrete placement.

K. Comply with ACI 305R recommendations for hot-weather concrete placement.

L. Identify pickup points of precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint casting date on each precast concrete unit on a surface that will not show in finished structure.

M. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture.

N. Product Tolerances: Fabricate precast structural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 116 product tolerances.

O. Finish formed surfaces of precast structural concrete as indicated for each type of unit, and as follows:

1. Standard Finish: Normal plant-run finish produced in forms that impart a smooth finish to concrete. Small surface holes caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls will be tolerated. Major or unsightly imperfections, honeycombs, or structural defects are not permitted.

2. Grade A Finish: Fill air pockets and holes larger than 1/4 inch in diameter with sand-cement paste matching color of precast concrete. Grind smooth form offsets or fins larger than 1/8 inch. Float-apply a neat cement-paste coating to exposed surfaces. Rub dried paste coat with burlap to remove loose particles.

   a. Provide at all surfaces of other units for required floor finishes and exposed ceilings.

P. Smooth steel trowel finish unformed surfaces. Consolidate concrete, bring to proper level with straightedge, float, and trowel to a smooth, uniform finish.

Q. Recess prestressing tendons a minimum of 1/2 inch, fill recesses with grout, and apply a sack finish to vertical ends of precast concrete units.

2.10 FABRICATION TOLERANCES

A. Fabricate precast structural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 116 product dimension tolerances.

2.11 HOLLOW-CORE SLAB UNITS

A. Type: Precast, prestressed concrete units with open, hollow cores running the full length of the slab units.

B. Furnish units free of voids and honeycombs.

C. Provide Grade A finish to precast concrete units.

D. Provide two- (2) hour fire rating for precast concrete slab units.

E. Reinforce units to resist transportation and erection stresses.

F. Include cast-in weld plates where required.

G. Coordinate with other trades for installation of cast-in items.

H. Provide solid, monolithic, precast concrete slab units forming an integral part of hollow-core slab unit system. Design and fabricate solid units to dimensions and details indicated for hollow-core slab units.

I. Provide headers of cast-in-place concrete or structural-steel shapes for openings larger than one (1) slab width according to hollow-core slab unit fabricator's written recommendations.

J. Provide ¼" holes in the underside of each plank core. Holes shall be located 24 inches from each end of plank to facilitate drainage of trapped moisture from the cores.

2.12 SOURCE QUALITY CONTROL

A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 116 requirements.

B. Strength of precast concrete units will be considered deficient if units fail to comply with PCI MNL 116 requirements, including the following:

1. Units fail to comply with compressive-strength test requirements.
2. Reinforcement and prestressed tendons of units do not comply with fabrication requirements.
3. Concrete curing and protection of units against extremes in temperature fail to comply with requirements.
4. Units are damaged during handling and erecting.

C. Testing: If there is evidence that the strength of precast concrete units may be deficient or may not comply with PCI MNL 116 requirements, Owner will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42.

1. A minimum of three (3) representative cores will be taken from units of suspect strength, from locations directed by Architect.
2. Cores will be tested in an air-dry condition per ACI 301 if units will be dry under service conditions.
3. Strength of concrete for each series of three (3) cores will be considered satisfactory if the average compressive strength is equal to at least eighty-five percent (85%) of the twenty-eight- (28) day design compressive strength and no single core is less than seventy-five percent (75%) of the twenty-eight- (28) day design compressive strength.
4. Test results will be made in writing on the same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:

   a. Project identification name and number.
   b. Date when tests were performed.
   c. Name of precast concrete fabricator.
   d. Name of concrete testing agency.
   e. Identification letter, name, and type of precast concrete unit or units represented by core tests; design compressive strength; type of break; compressive strength at break, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

D. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mix that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.

E. Dimensional Tolerances: Units with dimensions smaller or larger than required and not complying with tolerance limits may be subject to additional testing.

1. Precast concrete units with dimensions larger than required will be rejected if the appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction. Repair or remove and replace rejected units, as required, to comply with construction conditions.

F. Defective Work: Precast concrete units that do not comply with requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that comply with requirements.

G. Defective Units: Discard and replace precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Do not install precast concrete units until supporting, cast-in-place, building structural framing has attained minimum allowable design compressive strength or until supporting steel or other structure is complete.

3.2 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.

B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, supports, and bracing as required to maintain position, stability, and alignment of units until permanent connection.

1. Install temporary steel or plastic spacing shims or bearing pads as precast structural concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
4. For hollow-core slab voids used as electrical raceways or mechanical ducts, align voids between units and tape butt joint at end of slabs.

C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

1. Do not permit connections to disrupt continuity of roof flashing.

D. Field cutting of precast units is not permitted without approval of the Architect.

E. Bearing Pads: Install bearing pads as precast concrete units are being erected. Set pads on true, level, and uniform bearing surfaces and maintain in correct position until precast concrete units are placed.

F. Install precast structural concrete. Shore and brace precast concrete units to maintain location, stability, and alignment until permanent connections are installed.

G. Welding: Perform welding in compliance with AWS D1.1 and AWS D1.4, with qualified welders.

1. Protect precast concrete units and bearing pads from damage by field welding or cutting operations and provide non-combustible shields as required.
2. Repair damaged metal surfaces by cleaning and re-priming damaged painted surfaces.

H. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units unless approved by Architect.

I. Erection Tolerances: Install precast concrete units level, plumb, square, and true, without exceeding the recommended erection tolerances in PCI MNL 127, "Recommended Practice for Erection of Precast Concrete".

1. Additional Requirements: Maintain flatness of joints between core units not to exceed 1/4 of an inch.

J. Grouting: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled.

1. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces.
2. Fill joints completely without seepage to other surfaces.
3. Trowel top of grout joints on roofs smooth and uniform. Finish transitions between different surface levels not steeper than 1 to 12.
4. Place grout end cap or dam in voids at ends of hollow-core slabs.
5. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.
6. Keep grouted joints damp for not less than 24 hours after initial set.

3.3 ERECTION TOLERANCES

A. Erect precast structural concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135.

B. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Erection of precast structural concrete members.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Field welds will be visually inspected and nondestructive tested according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Repair or remove and replace work that does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS

A. Blemishes occurring after delivery are normally repaired after erecting units. Repairs of production chips, cracks, and spalls take place at manufacturer's plant.

B. Repair precast structural concrete units if permitted by Architect.

1. Repairs may be permitted if structural adequacy, serviceability, durability, and appearance of units has not been impaired.

C. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet (6 m).

D. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780.

E. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

F. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Architect.

3.6 CLEANING

A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 03 41 00

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SECTION 03 54 00 - CEMENT-BASED UNDERLAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes:

1. Cement-based, polymer-modified, self-leveling underlayment for interior finish flooring.

B. Related Sections include the following:

1. Division 09 Sections for patching and leveling compounds applied with finish flooring.

1.3 SUBMITTALS

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

B. Shop Drawings: Plans indicating substrates, locations, and average depths of cement-based underlayment based on survey of substrate conditions.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer (applicator) who is acceptable to manufacturer, who has completed cement-based underlayment applications similar in material and extent to that required for this Project, and whose work has resulted in construction with a record of successful in-service performance.

B. Mockups: Before installing underlayment, apply mockups to demonstrate qualities of materials and execution. Comply with the following requirements, using materials indicated for the completed Work:

1. Architect will select one floor area or surface to represent surfaces and conditions for application on each substrate required.
2. Notify Architect seven days in advance of dates and times when mockups will be applied.
3. Obtain Architect's approval of mockups before starting underlayment application.

4. Maintain mockups, during underlayment application and until installation of finish flooring, in an undisturbed condition as a standard for judging the completed Work.
5. Approved mockups may become part of the completed Work if undisturbed when finish flooring is installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage, mixing with other components, and application.

B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written recommendations for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.

B. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.

1.7 COORDINATION

A. Coordinate cement-based underlayment with requirements of finish flooring products, including adhesives, specified in Division 9 Sections.

1. Before installing surface sealers recommended by underlayment manufacturer, if any, verify compatibility with finish flooring installation adhesives.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. K-15 Self-Leveling Underlayment Concrete; Ardex, Inc.
2. LeveLayer I; Dayton Superior Corp.
3. Thoro Underlayment, Self-Leveling; Harris Specialty Chemicals, Inc.
4. Levelex Underlayment; L&M Construction Chemicals, Inc.
5. Level-Right; Maxxon Corporation.

2.2 PRODUCTS AND MATERIALS

A. Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in uniform thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
2. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
3. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer formulated for use with underlayment when applied to substrate and conditions indicated.

B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch, or coarse sand as recommended by underlayment manufacturer.

1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

C. Water: Potable and at a temperature of not more than 70 deg F.

D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of underlayment including substrate moisture content. Begin underlayment application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions for substrate indicated. Provide clean, dry, neutral-pH substrate for underlayment application.

1. Treat nonmoving substrate cracks to prevent cracks from telegraphing (reflecting) through underlayment according to manufacturer's written recommendations.
2. Fill substrate voids to prevent underlayment from leaking.

B. Concrete Substrates: Mechanically remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond according to manufacturer's written instructions.

C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
2. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate if required to produce smooth surface.
2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install finish flooring over underlayment until after time period recommended by underlayment manufacturer.

F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated on the percent complete to one decimal point (such as 7.5%).
3. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
4. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to MaineDOT, and consent of surety to payment, for stored materials.

2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 03 54 00

SECTION 04 81 00 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:

1. Concrete masonry units.
2. Mortar and grout.
3. Reinforcing steel.
4. Masonry joint reinforcement.
5. Ties and anchors.
6. Miscellaneous masonry accessories.

1.3 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry by testing masonry prisms according to ASTM C 1314

1. For Concrete Unit Masonry: f'm = 2000 psi.

B. Product Data: For each different masonry unit, accessory, and other manufactured product specified.

C. Samples for Initial Selection: For the following:

D. Samples for Verification: For the following:

1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Each type of masonry unit required.
2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
3. Each material and grade indicated for reinforcing bars.
4. Each type and size of joint reinforcement.
5. Each type and size of anchor, tie, and metal accessory.

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

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

1. Protect Type I concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

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

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

C. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.

1. When ambient temperature exceeds 100 deg F , or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Concrete Masonry Units: ASTM C 90 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
2. Weight Classification: Normal weight.
3. Provide Type I, moisture-controlled units.
4. Size (Width): Manufactured to the following dimensions:

a. SFCB: 8 inches nominal; 7-5/8 inches actual.

5. Exposed Faces: Standard
6. Colors: Standard Gray

2.2 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.

D. Cold-Weather Admixture: Non chloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.

E. Water: Potable.

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

1. Cold-Weather Admixture:

a. Accelguard 80; Euclid Chemical Co.
b. Morseled; W. R. Grace & Co., Construction Products Division.
c. Trimix-NCA; Sonneborn, Div. of ChemRex, Inc.

G. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60.

H. Epoxy-Coated Reinforcing Steel: ASTM A 615/A 615M, Grade 60; epoxy coated to comply with ASTM A 775/A 775M.

2.3 MASONRY JOINT REINFORCEMENT

A. General: ASTM A 951 and as follows:

1. Hot-dip galvanized, carbon-steel wire for interior walls.
2. Wire Size for Side Rods: W1.7 or 0.148-inch diameter.
3. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
4. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units where indicated.

B. For single-wythe masonry, provide either ladder or truss type with single pair of side rods and cross rods spaced not more than 16 inches o.c.

2.4 TIES AND ANCHORS, GENERAL

A. General: Provide ties and anchors, specified in subsequent articles, made from materials that comply with this Article, unless otherwise indicated.

B. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.

C. Galvanized Steel Sheet: ASTM A 653/A 653M, G60, commercial-quality, steel sheet zinc coated by hot-dip process on continuous lines before fabrication.

D. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.5 ADJUSTABLE ANCHORS FOR CONNECTING TO STEEL FRAME

A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire anchor section for welding to steel.

2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.25-inch-diameter, hot-dip galvanized steel wire.

2.6 MISCELLANEOUS ANCHORS

A. Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations:

1. Headed bolts.
2. Nonheaded bolts, bent in manner indicated.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. Styrene-Butadiene-Rubber Compound: ASTM D 2000, Designation M2AA-805.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication.

1. Provide units with either two loops or four loops as needed for number of bars indicated.

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

1. Reinforcing Bar Positioners:

a. D/A 811; Dur-O-Wal, Inc.
b. D/A 816; Dur-O-Wal, Inc.
c. No. 376 Rebar Positioner; Heckman Building Products, Inc.
d. #RB Rebar Positioner; Hohmann & Barnard, Inc.
e. #RB-Twin Rebar Positioner; Hohmann & Barnard, Inc.
f. Double O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.
g. O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.

2.8 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification.

C. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.

D. Color: As selected by the Architect from Manufacturer's full line of pigmented colors.

2.9 SOURCE QUALITY CONTROL

A. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Verify that foundations/slabs are within tolerances specified.
2. Verify that reinforcing dowels are properly placed.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

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

3.2 INSTALLATION, GENERAL

A. Thickness: Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.

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

C. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

D. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

3.3 CONSTRUCTION TOLERANCES

A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet maximum.

C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet maximum.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

1. One-half running bond with vertical joint in each course centered on units in courses above and below.

C. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.

D. Fill space between hollow-metal frames and masonry solidly with mortar, unless otherwise indicated.

E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

F. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.

3.6 MASONRY JOINT REINFORCEMENT

A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inches on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches (406 mm) o.c.

B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

3.7 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
2. Space anchors as indicated, but not more than 24 inches o.c. vertically.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake joints in exposed faces.

3.9 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

3.10 MASONRY WASTE DISPOSAL

A. Recycling: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 04 81 00

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SECTION 05 12 00 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes:

1. Structural steel Shapes, plates and angles
2. Beams
3. Columns

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

1. Division 1 Section "Quality Control" for independent testing agency procedures and administrative requirements.
2. Division 5 Section "Steel Deck" for field installation of shear connectors.
3. Division 5 Section "Metal Fabrications" for loose steel bearing plates and miscellaneous steel framing.
4. Division 9 Section "Painting" for surface preparation and priming requirements.

1.3 PERFORMANCE REQUIREMENTS

A. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer registered in the State of Maine to prepare Shop Drawings and other structural data for structural steel fabrication.

1.4 SUBMITTALS

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

B. Shop Drawings detailing fabrication of structural steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.

C. Certification:

1. Submit a letter of certification from the material fabricator sealed by a professional engineer licensed to practice in the State of Maine attesting that all shop drawings were prepared under his direct supervision.
2. Submit certification that field welders are AWS certified.

D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Mill test reports signed by manufacturers certifying that their products, including the following, comply with requirements.

1. Structural steel, including chemical and physical properties.
2. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
3. Shop primers.
4. Nonshrink grout.

1.5 QUALITY ASSURANCE

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

B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.

1. Fabricator must hold current membership and be a member in good standing in either AISC or Structural Steel Fabricators of New England (SSFNE).

C. Comply with applicable provisions of the following specifications and documents:

1. AISC’s “Code of Standard Practice.
2. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
3. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
4. AISC's "Seismic Provisions for Structural Steel Buildings."
5. ASTM A 992/A 992M “Specifications for High-Strength Low-Allow Columbium-Vanadium Structural Steel”

6. ASTM A 307 “Specifications for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength”
7. ASTM A 325 “Specifications for Structural Bolts, Steel Heat Treated, 120/105 ksi Minimum”
8. ASTM A 500 “Specifications for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes”
9. ASTM A 6 "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
10. Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
11. Research Council on Structural Connections' (RCSC) "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.

E. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel."

1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

F. Structural Steel Painting Manual: Comply with applicable provisions of the “Structural Steel Painting Manual.

G. Structural Steel Painting Council: Comply with provisions as follows:

1. SSPC-SP3 - Power Tool Cleaning
2. SSPC-SP6 – Commercial Blast Cleaning

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.

2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.7 SEQUENCING

A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural steel W-shapes shall conform to ASTM Specification, Serial Designation A 992, as amended to date. Structural steel shapes (other than W-shapes), plates and bars shall conform to ASTM Specification for Bridges and Buildings, Serial Designation A 36, as amended to date. No secondhand materials shall be used.

B. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B (Fy = 46 ksi). Hot-Formed Steel

C. Pipe: ASTM A 53, Type E or S, Grade B.

D. Anchor Rods, Bolts, Nuts, and Washers: As follows:

1. Unheaded Rods: ASTM F1554.
2. Headed Bolts: ASTM A 307, Grade A; carbon-steel, hex-head bolts; and carbon-steel nuts.
3. Headed Bolts: ASTM A 325, Type 1, heavy hex steel structural bolts and heavy hex carbon-steel nuts.
4. Headed Bolts: ASTM A 490, Type 1, heavy hex steel structural bolts and heavy hex carbon-steel nuts.
5. Washers: ASTM A 36.

E. Non high-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A; carbon-steel, hex-head bolts; carbon-steel nuts; and flat, unhardened steel washers.

1. Finish: Plain, uncoated.

F. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain, uncoated.
2. Direct-Tension Indicators: ASTM F 959, Type 325.

a. Snap off tension indicating high-strength bolts certified to provide the minimum fastener tension per AISC “Specifications for Structural Joints Using ASTM A 325 or ASTM A 490”

1) Finish: Plain, uncoated.

G. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers, uncoated.

1. Direct-Tension Indicators: ASTM F 959, Type 490, uncoated.

a. Snap off tension indicating high-strength bolts certified to provide the minimum fastener tension per AISC "Specifications for Structural Joints Using ASTM A 325 or ASTM A 490"

H. Welding Electrodes: Comply with AWS requirements.

2.2 PRIMER

A. Primer: All structural steel exposed in the building shall be sandblasted and shop painted with primer paint - Fabricator's Standard Lead – and Chromate-Free, Non-Asphaltic, Rust-inhibiting Primer, except that paint shall conform to AISC specifications and shall be suitable for top coating.

2.3 GROUT

A. Non-Shrink Grout: Premixed compound with non-metallic aggregate, cement, water-reducing and plasticizing agents capable of minimum compression strength of 2,400 lbs. Non-shrink grout shall be "Eucon "N-S" (non-metallic) by the Euclid Chemical Co., "Masterflow 713" (non-metallic) by Master Builders, Five Star Grout by U.S. Grout Corp., or approved equal.

2.4 FABRICATION

A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.

1. Camber structural steel members where indicated.
2. Identify high-strength structural steel according to ASTM A 6 and maintain markings until steel has been erected.
3. Mark and match-mark materials for field assembly.
4. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
5. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
6. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded.

C. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.

2.5 SHOP CONNECTIONS

A. Shop install and tighten non high-strength bolts, except where high-strength bolts are indicated.

B. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Shop install and tighten high-strength bolts according to RCSC's "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Bolts: ASTM A 325 high-strength bolts, unless otherwise indicated.
2. Connection Type: Slip-critical, direct-tension, or tensioned shear/bearing connections as indicated.

D. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

2.6 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed-on fireproofing.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC specifications as follows:

1. SSPC-SP 3 "Power Tool Cleaning."
2. SSPC-SP 6 "Commercial Blast Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.7 SOURCE QUALITY CONTROL

A. Contractor shall engage an independent testing and inspecting agency to perform shop inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether test specimens comply with or deviate from requirements.
2. Provide testing agency with access to places where structural steel Work is being fabricated or produced so required inspection and testing can be accomplished.

B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

D. Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

E. In addition to visual inspection, shop-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
4. Ultrasonic Inspection: ASTM E 164.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before erection proceeds, and with the steel erector present, verify elevations of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements.

B. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 WORKMANSHIP - GENERAL

A. Workmanship shall be equal to the best practice in modern structural shops. Material shall be clean and straight. All holes shall be accurately drilled or punched. Burning and drifting to enlarge holes will not be permitted. Holes that must be enlarged shall be reamed. Particular care shall be taken to protect all materials from injury of any kind, either in transportation, storage or erection. Material that is damaged must be replaced by perfect material or repaired in a manner approved and accepted by the Engineer. The use of drift pins will be allowed only to bring together the several parts, and they must not be driven with such force as to distort or injure the material. Material that has been distorted by drift pins will not be accepted.

B. All shop and field welding shall be performed by certified welders in conformance with American Welding Society's "Code for Arc and Gas Welding in Building Construction."

C. No holes shall be burned in steel members under any circumstances without express approval and instructions from the Engineer.

D. Bolted members shall have all parts well pinned-up and firmly drawn together. Abutting joints shall be dressed or cut true and straight and fitted closely together. In compression joints, depending upon contact bearing, the surfaces shall be truly faced so as to have even bearing after they are bolted up complete; and, when properly aligned, the several pieces forming one

built-up member shall be straight and shall fit closely together. Finished members shall be free from twists, bends or open joints. Abutting joints in compression members faced for bearing shall be spliced sufficiently to hold the connecting members accurately in place. All other joints in bolted work, whether in tension or compression, shall be fully spliced.

3.3 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.4 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.

B. Base Plates, Bearing Plates and Embed Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.

1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
2. Set embed base plates accurately and secure properly to avoid movement during concrete placement.
3. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
4. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

    a. Comply with manufacturer's instructions for proprietary grout materials.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.

H. Protect steel embedded in concrete or gravel with a liberal brushed coat of asphalt mastic.

3.5 FIELD CONNECTIONS

A. Install and tighten non-high-strength bolts, except where high-strength bolts are indicated.

B. Install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Provide shoring and bracing of steel columns to be field welded at bases to embed base plates. Ensure columns are plum and accurately aligned prior to welding.
3. Primer welds after connection is complete.

3.6 FIELD QUALITY CONTROL

A. Contractor shall engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.

B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

D. Field-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

E. In addition to visual inspection, field-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing agency's option.

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
4. Ultrasonic Inspection: ASTM E 164

F. CLEANING

G. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.

H. Finish Painting: Finish painting of steel surfaces are included in Division 9 “Painting”

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for materials acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 05 12 00

SECTION 05 31 00 - STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, “Standard Specifications,” Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes the following:

1. Mezzanine Floor Deck.
2. Elevator Cap.
3. Existing Building Replacement Roof Deck

B. Related Sections include the following:

1. Division 5 Section "Structural Steel" for shop-welded shear connectors.
2. Division 5 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, and deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

C. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1.6 PROJECT CONDITIONS

A. Design:

1. Steel deck shall be designed in accordance with the AISI "Specifications for the Design of Cold-Formed Steel Structural Members." Simple short spans shall be avoided, and all deck units shall extend over three or more supports unless absolutely impractical.
2. Design Loads: As specified on the drawings.

1.7 COORDINATION

A. Coordinate installation of sound-absorbing insulation strips in topside ribs of 3” acoustical deck with roofing installation specified in Division 7 to ensure protection of insulation strips against damage from effects of weather and other causes.

PART 2 - PRODUCTS

2.1 DECK

A. Steel Floor Deck: (Mezzanine): Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer. Color: Manufacturer's standard.
2. Deck Profile: Type NR, narrow rib.
3. Profile Depth: 9/16 inches
4. Design Uncoated-Steel Thickness: 24 GAGE
5. Span Condition: Double span.
6. Field Fastening: #12 TEK screws at 12” on-center spacing
7. Side Laps: fasteners #12 TEK screws (1 per rafter span).
8. Edge Angle/Beam Fastening: #12 TEK at 21” o.c.

B. Steel Roof Deck: (Main Building): Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer. Color: Manufacturer's standard.
2. Deck Profile: Type E.
3. Profile Depth: 1 inch
4. Design Uncoated-Steel Thickness: 22 GAGE
5. Span Condition: Double span.
6. Field Fastening: #12 TEK screws at 12” on-center spacing
7. Perimeter Zone and Corners: #12 TEK screws at 6” o.c.
8. Side Laps: Fasteners #12 TEK screws (2” on-center plus 1 per rafter).
9. Edge Angle/ Perimeter Beam Fastening: #12 TEK at 6” o.c. or 5/8” puddle weld @ 6” on-center spacing with welded washers.

C. Steel Roof Deck (3") @ Elevator Cap: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer. Color: Manufacturer's standard.
2. Deck Profile: Type C.
3. Profile Depth: 3 inch
4. Design Uncoated-Steel Thickness: 22 GAGE
5. Span Condition: Single span.
6. Perimeter Fastening: 5/8” puddle welds at 12” on-center spacing to perimeter cast in plate.

D. ACCESSORIES

E. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

F. Reinforcing Plates: Provide .057” thick reinforcing plates for all openings less than 12 inches in diameter. Length and width of plates as required satisfying The Steel Deck Institute requirements.

G. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

H. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

I. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

J. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch designs uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

K. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

L. End Closures: Provide end closures of minimum 22 gauge to close the ends at end walls, eaves, and openings through the roof.

M. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, thickness as required by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate decking bundles to prevent overloading of supporting members.

1. Exercise special care not to damage the material or overload the decking during the entire construction period. The maximum uniform distribution storage load shall not exceed the design live load.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

1. Simple short spans shall be avoided, and all deck units shall extend over two or more supports unless absolutely impractical. Do not use unanchored deck units as a work or storage platform.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking. Reinforce and frame openings through roof in accordance with the drawings for rigidity and load-carrying capacity. Holes or other openings required for the work of other trades shall be drilled or cut and reinforced by the respective trades; the deck manufacturer and the Engineer shall approve such holes or other openings larger than 6 inches in diameter.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 DECK INSTALLATION

A. Immediately after placement and alignment, and after inaccuracies have been corrected, permanently fasten steel roof deck and floor deck units in place. Clamp or weight deck units to provide firm contact

between deck units and structural supports while fastening is being performed. Decking shall be fastened as recommended by the manufacturer unless indicated otherwise on the drawings.

B. End Bearing: Install deck ends over supporting frame as per drawings or unless otherwise noted, with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum

3.4 FIELD QUALITY CONTROL

A. Contractor shall engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.

B. Correct deficiencies in or remove and replace metal decking that inspections and test reports indicate do not comply with specified requirements.

C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

D. Inspect the decking top surface for flatness after installation. Place a four-foot straightedge across the decking ribs over the structural supporting members at all locations. If the straightedge fails to touch the entire top surface of the decking or if top surfaces of abutting units are not in alignment, corrective measures or replacement shall be provided. After corrective measures or replacement has been performed, the decking shall be reinspected.

E. Field welds will be subject to inspection.

F. Testing agency will report test results promptly and in writing to Contractor and Engineer.

G. Remove and replace work that does not comply with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 05 31 00

SECTION 05 40 00 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

B. Related Sections include the following:

1. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.
2. Division 6 Section "Rough Carpentry" for wall sheathing, or roof sheathing using wood-based structural-use panels.
3. Division 9 Section "Gypsum Board Assemblies" for interior non-load-bearing metal-stud framing and ceiling-suspension assemblies.

1.2 DEFINITIONS

A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than ninety-five percent (95%) of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.

B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated as indicated on the structural drawings.
2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

   a. Exterior Non-Load-Bearing Curtain-Wall Framing:
      1) Metal siding: Horizontal deflection of 1/360 of the wall height for siding.
   b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/240 of the wall height.
   c. Ceiling Joist Framing: Vertical deflection of 1/360 of the span.

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120°F°.

4. Design wall framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

   a. Downward movement of 3/4 inch.

B. Design exterior non-load-bearing curtain-wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.4 SUBMITTALS

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining Work.

   1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   2. Include complete details for all member connections at openings and other discontinuities of the wall system.
   3. Specify connections to supports at top and bottom of wall including spacings at jambs of openings.

C. Welding Certificates: Copies of certificates for welding procedures and personnel.

D. Qualification Data: For firms and persons specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:

   1. Steel sheet.
   2. Expansion anchors.
   3. Power-actuated anchors.
   4. Mechanical fasteners.
   5. Vertical deflection clips.
   6. Horizontal drift deflection clips
   7. Miscellaneous structural clips and accessories.

F. Research/Evaluation Reports: Evidence of cold-formed metal framing’s compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced Installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Engineering Responsibility: Engage a qualified professional engineer to prepare design calculations, Shop Drawings, and other structural data.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

E. Mill certificates signed by steel sheet producer or test reports from a qualified independent testing agency indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and galvanized-coating thickness.

F. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel", and AWS D1.3, "Structural Welding Code--Sheet Steel".

G. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by GA File Numbers in GA-600, "Fire Resistance Design Manual", or by design designations from UL's "Fire Resistance Directory' or from the listings of another testing and inspecting agency.

H. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" or "Load and Resistance Factor Design Specification for Cold-Formed Steel Structural Members" and the following for calculating structural characteristics of cold-formed metal framing:

I. 1. CCFSS Technical Bulletin: "AISI Specification Provisions for Screw Connections".

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: The design for connector devices is based on The Steel Network, Inc. as indicated in other Part 2 Articles. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. Dale Industries, Inc.
2. Dietrich Industries, Inc.
3. MarinoWare; Div. of Ware Industries, Inc.
4. The Steel Network

2.2 MATERIALS

A. Steel Sheet: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: 50, Class 1 or 2 for 12, 14 and 16 gauge material.
2. Grade: 33 for 18 and 20 gauge material.
3. Coating: G90.

2.3 EXTERIOR NON-LOAD-BEARING FRAMING

A. Steel Studs: Manufacturer’s standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness: 0.0329 inch.
2. Flange Width: 1-5/8 .

B. Steel Track: Manufacturer’s standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness: Matching steel studs.
2. Flange Width: 1-1/4 inches.

C. Vertical Deflection Clips: Manufacturer's standard bypass and head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web. Mechanical attachment to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement; 68 mils minimum thickness, size as required by structural design calculations. Use only vertical deflection connection products that have a valid ICC ES Report complying with ICC Acceptance Criteria AC261, such as ICC-ESR-1903 or equivalent.

1. Basis-of-Design Product: The Steel Network, Inc. VertiClip including step bushings.

a. Exterior Head of Wall: The Steel Network, Inc. VertiClip SL.
b. Exterior Head of Wall Preassembled with Track: The Steel Network, Inc. VertiTrack VTX.
c. By-pass Structural Pour Stop at Floor Slab: The Steel Network, Inc. VertiClip SLB.
d. By-pass Floor Slab or Structure: The Steel Network, Inc. VertiClip SLT.
e. By-pass Structure: The Steel Network, Inc. VertiClip SLS.

2.4 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness: 0.0428 inch.
2. Flange Widths: 1-3/8 inches and 2 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness: Matching steel studs.
2. Flange Width: 1-1/4 inches.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: 1-5/8 inches.

D. Wall Bridging:

1. Channel Bridging Inside Wall: 1-1/2 inch (38 mm) web, 3/4-inch (19 mm) flanges, 0.0342 inch (0.87 mm) uncoated thickness and G-90 hot-dipped galvanized coating according to ASTM A 123/A 123M. Maximum 4' on –center vertical spacing.

   a. Basis-of-Design Product: The Steel Network, Inc. Bridge Bar BB150.

2. Channel Bridging Inside Wall: 1-1/2 inches (38 mm) tab at one end, 1-1/2 inches (38 mm) slot at other end, 16 inches (406 mm) in length. Maximum 4' on –center vertical spacing.

   a. Basis-of-Design Product: The Steel Network, Inc. Buckle Bridge.

E. Bridging Clip: The Steel Network, Inc. Bridge Clip BC600 with 6-inch stud depth and Bridge Clip BC800 with 8-inch stud depth. ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: G90 (Z275).
3. Flat Strap. Width and thickness as required by structural design calculations.
4. Solid Bridging: Channel-shaped bridging with lipped flanges and integral formed clips; 33 mils (0.84 mm) minimum thickness, size as required by structural design calculations.

F. The Steel Network's BackIt™ Rigid Wall Backing product is designed to provide a solid backing solution to support handrails, wall-mounted shelving and similar equipment.

G. Special Solid Backing Support Plates: The Steel Network, Inc. BackIt Rigid Wall Backing plates designed to provide a solid backing support for handrails, wall-mounted shelving and similar equipment. ASTM A653/A653M structural steel, zinc coated of grade and coating as follows:

1. Grade 50 (340), Class 1 or 2.
2. Coating: G-60 steel
3. Minimum Design Thickness of 0.0346 inch (0.879 mm).

2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch.
2. Flange Width: 1-5/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: 2 inches.

C. Vertical Deflection Clips: Manufacturer's standard [bypass] [head] clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

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

a. ClarkWestern Building Systems, Inc.
b. Dietrich Metal Framing; a Worthington Industries company.
c. MarinoWARE.
d. Steel Network, Inc. (The).

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: 1 inch plus the design gap for one-story structures.

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 CEILING JOIST FRAMING

A. Steel Ceiling Joists: Manufacturer’s standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness: 0.0428 inch.
2. Flange Width: 1-5/8 inches, minimum.

2.7 SOFFIT FRAMING

A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch.
2. Flange Width: 1-5/8 inches, minimum.

2.8 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi.

B. Provide accessories of manufacturer’s standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. End clips.

5. Foundation clips.
6. Gusset plates.
7. Stud kickers, knee braces, and girts.
8. Joist hangers and end closures.
9. Hole reinforcing plates.
10. Backer plates.

C. Special Solid Backing Support Plates: The Steel Network, Inc. BackIt Rigid Wall Backing plates designed to provide a solid backing support for handrails, wall-mounted shelving and similar equipment. ASTM A653/A653M structural steel, zinc coated of grade and coating as follows:

1. 1. Grade 50 (340), Class 1 or 2.
2. 2. Coating: G-60 steel
3. 3. Minimum Design Thickness of 0.0346 inch (0.879 mm).

2.9 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.

B. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to five (5) times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to ten (10) times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

D. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer’s standard elsewhere.

E. Vertical Deflection Clips: Manufacturer’s standard head clips, capable of accommodating upward and downward vertical displacement of primary structure.

1. Construction: Slotted galvanized steel angle with step bushing to prevent over tightening of fasteners.
2. Vertical Deflection: 1-1/2 inches total travel .
3. Product: Subject to compliance with requirements, provide VertiClip, Signature Industries, 919-844-0789.
4. Series: SL, SDL, SLB, AND SLS as required by attachment condition.

2.10 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: [SSPC-Paint 20 or DOD-P-21035] [ASTM A 780].

B. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, non-staining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

C. Shims: Load bearing, high-density multi-monomer plastic, non-leaching.

D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.11 FABRICATION TOLERANCES

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below

that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.

B. Install field-fabricated, cold-formed framing and securely anchor to supporting structure.

C. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.

a. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three (3) exposed screw threads.

D. Install framing members in one- (1) piece lengths, unless splice connections are indicated for track or tension members.

E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

F. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

G. Install insulation in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

I. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacing's as follows:

1. Anchor Spacing: 24 inches, or as shown on shop drawings.

B. Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:

1. Stud Spacing: As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar configurations.

D. Align studs vertically where wall-framing continuity is interrupted by floor framing. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor precast concrete plank over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced 48 inches apart. Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle.

J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 NON-LOAD-BEARING CURTAIN-WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: 16 inches unless otherwise indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Connect drift clips to cold-formed metal framing and anchor to building structure.

E. Install horizontal bridging in curtain-wall studs, spaced in rows indicated on Shop Drawings but not more than 54 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track.
2. Bridging may be either of the following:

a. Bridging: Cold-rolled steel channel mechanically fastened to webs of punched studs.
b. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
1) Space solid blocking at 8 feet on center.

3.6 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing agency to perform field quality-control testing.

B. Field and shop welds will be subject to inspection and testing.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace Work that does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

3.7 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touch-up Painting: Wire brush, clean, and paint scarred areas, welds, and rust spots on fabricated and installed prime-painted, cold-formed metal framing. Paint framing surfaces with same type of shop paint used on adjacent surfaces.

C. Protect paper-surfaced gypsum sheathing that will be exposed to weather for more than thirty (30) days by covering exposed exterior surface of sheathing with a securely fastened air-infiltration barrier. Apply covering immediately after sheathing is installed.

D. Protect cutouts, corners, and joints in sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at time sheathing is applied.

E. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

   a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
   b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
   c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 05 00 00

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SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for operable partitions.
2. Steel framing and supports for overhead doors.
3. Steel framing and supports for countertops.
4. Steel tube reinforcement for low partitions.
5. Steel framing and supports for mechanical and electrical equipment.
6. Steel framing and supports for applications where framing and supports are not specified in other Sections.
7. Elevator machine beams and hoist beams.
8. Light-duty gantry.
9. Steel shapes for supporting elevator door sills.
10. Metal ladders.
11. Elevator pit sump covers.
12. Structural-steel door frames.
13. Sliding door track support.
14. Miscellaneous steel trim including steel edgings.
15. Metal bollards.
16. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Steel framing and supports for operable partitions.
2. Steel framing and supports for overhead doors.
3. Steel framing and supports for countertops.
4. Steel tube reinforcement for low partitions.
5. Steel framing and supports for mechanical and electrical equipment.
6. Steel framing and supports for applications where framing and supports are not specified in other Sections.
7. Elevator machine beams and hoist beams.
8. Light-duty gantry.
9. Steel shapes for supporting elevator door sills.
10. Metal ladders.
11. Elevator pit sump covers.
12. Structural-steel door frames.
13. Miscellaneous steel trim including steel edgings.
14. Metal bollards.
15. Loose bearing and leveling plates for applications where they are not specified in other Sections.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design alternating tread devices.

B. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

1. Provide ladders meeting the OSHA requirements of 29CFR 1910.27.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

D. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.

2. Provide stainless-steel fasteners for fastening stainless steel.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.

D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.

E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

F. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

G. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

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

a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
b. ICI Devoe Coatings; Catha-Coat 313.
c. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
d. PPG Architectural Finishes, Inc.; Epoxy Zinc Rich Primer 97-670.
e. Sherwin-Williams Company (The); Zinc Clad IV, B69A8/B69V8.

f. Tnemec Company, Inc.; Tneme-Zinc 90-97.

C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

1. Available Products:

a. Sealmastic, Type 1; W. R. Meadows
b. Hydrocide 600; Sonneborn Building Products.
c. Karnak 100 AF; Karnac Chemical Corp.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

1. Available Products:

a. Five Star Grout by Five Star Products, Inc.
b. Masterflow 928 Grout by Master Builders Technologies.
c. Sonogrout 10K by Sonneborn.
d. 14K Hy Flow by Sonneborn.

G. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated or recommended by partition manufacturer with attached bearing plates, anchors, and braces as indicated or recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

D. Galvanize miscellaneous framing and supports where indicated.

E. Prime miscellaneous framing and supports.

2.7 METAL LADDERS

A. General:

1. Comply with ANSI A14.3, except for elevator pit ladders.
2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

B. Fabricate ladders from materials as detailed on the drawings or if not indicated, as follows:

1. Space siderails 18 inches apart unless otherwise indicated.
2. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.
3. Rungs: 3/4-inch- diameter steel bars, spaced 12 inches o.c..
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
6. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
7. Prime ladders, including brackets and fasteners, with zinc-rich primer.

2.8 ELEVATOR PIT SUMP COVERS

A. Fabricate from 3/16-inch rolled-steel floor plate with four 1-inch- diameter holes for water drainage and for lifting.

B. Fabricate from welded or pressure-locked steel bar grating Limit openings in gratings to no more than 1/2 inch in least dimension.

C. Support Frame: Provide 1-1/2 by 1-1/2 by 1/4 inch steel angle around perimeter of sump pit, fastened with 1/4 inch galvanized expansion anchors.

D. Galvanize steel elevator pit cover, including support frame and fasteners.

2.9 STRUCTURAL-STEEL DOOR FRAMES

A. Fabricate structural-steel door frames from steel shapes, plates, and bars of size and to dimensions indicated, fully welded together, with 5/8-by-1-1/2-inch steel channel stops, unless otherwise indicated. Plug-weld built-up members and continuously weld exposed joints. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than 10 inches o.c. Reinforce frames and drill and tap as necessary to accept finish hardware.

B. Extend bottom of frames to floor elevation indicated with steel angle clips welded to frames for anchoring frame to floor with expansion shields and bolts.

C. Prime exterior steel frames with zinc-rich primer.

2.10 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

B. Prime bollards with zinc-rich primer.

2.11 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Prime plates with zinc-rich primer.

2.12 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.

C. Prime loose steel lintels with zinc-rich primer.

2.13 HALF-WALL SUPPORT POST

A. Prefabricated steel post designed to fit into 3-5/8 inch metal stud wall to support short walls.

1. Available Products: SKB Knee Brace Kit by Pittcon Softforms, LLC.

2.14 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.15 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.16 STEEL AND IRON FINISHES

A. Galvanizing: Provide coating for iron and steel fabrications applied by the hot-dipped process, Duragalv by Duncan Galvanizing. The galvanizing bath shall contain high grade zinc and other earthly materials. Immediately before galvanizing, the steel shall be immersed in a bath of zinc ammonium chloride. The use of the wet kettle process is prohibited. Comply with ASTM A123 for fabricated products and ASTM A 153 for hardware. Provide thickness of galvanizing specified in referenced standards.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions and overhead doors securely to, and rigidly brace from, building structure.

C. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING METAL BOLLARDS

A. Anchor bollards in place with gravel backfill. Place backfill and vibrate or tamp for consolidation. Support and brace bollards in position.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

1. Do not fill removable bollards with concrete.

3.4 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 ELEVATOR SUMP PIT COVER

A. Set perimeter support angles 1/4 inch below the edge of the sump pit to allow the sump cover plate to set flush with elevator pit floor.

3.6 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated on the percent complete to one decimal point (such as 7.5%).
3. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
4. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to MaineDOT, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

   a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
   b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
   c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 05 50 00

SECTION 05 51 00 - METAL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section Includes:

1. Preassembled steel stairs with concrete-filled treads.
2. Steel tube railings attached to metal stairs.
3. Steel tube handrails attached to walls adjacent to metal stairs.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal stairs, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Uniform Load: 100 lbf/sq. ft..
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.

C. Structural Performance of Railings: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. applied in any direction.

b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
b. Infill load and other loads need not be assumed to act concurrently.

D. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor is 1.5.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

B. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.

1. Preassembled Stairs: Commercial class.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513.

C. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.

D. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, either commercial steel, Type B, or structural steel, Grade 30, unless another grade is required by design loads.

2.3 FASTENERS

A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

D. Machine Screws: ASME B18.6.3.

E. Lag Screws: ASME B18.2.1.

F. Plain Washers: Round, ASME B18.22.1.

G. Lock Washers: Helical, spring type, ASME B18.21.1.

H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

1. Available Products:

a. Five Star Grout by Five Star Products, Inc.
b. Masterflow 928 Grout by Master Builders Technologies.
c. Sonogrout 10K by Sonneborn.
d. 14K Hy Flow by Sonneborn.

E. Concrete Materials and Properties: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.

F. Welded Wire Fabric: ASTM A 185/A 185M, 6 by 6 inches, W1.4 by W1.4, unless otherwise indicated.

2.5 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding unless otherwise indicated.
2. Use connections that maintain structural value of joined pieces.
3. Fabricate treads and platforms of exterior stairs so finished walking surfaces slope to drain.

B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Form exposed work with accurate angles and surfaces and straight edges.

F. Weld connections to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Weld exposed corners and seams continuously unless otherwise indicated.
5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 welds: completely sanded joint, some undercutting and pinholes okay.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.6 STEEL-FRAMED STAIRS

A. Stair Framing:

1. Fabricate stringers of steel channels.

   a. Provide closures for exposed ends of channel stringers.

2. Construct platforms of steel channel headers and miscellaneous framing members as indicated.
3. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.
4. Where stairs are enclosed by gypsum board assemblies, provide hanger rods or struts to support landings from floor construction above or below. Locate hanger rods and struts

where they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

B. Metal-Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.067 inch.

1. Steel Sheet: Uncoated cold-rolled steel sheet.
2. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
3. Shape metal pans to include nosing integral with riser.
4. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.

   a. Smooth Soffit Construction: Construct subplatforms with flat metal under surfaces to produce smooth soffits.

2.7 STAIR RAILINGS

A. Steel Tube Railings: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.

1. Configuration: As indicated on the drawings.

B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 welds: completely sanded joint, some undercutting and pinholes okay.

C. Form changes in direction of railings as follows:

1. As detailed.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

E. Close exposed ends of railing members with prefabricated end fittings.

F. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.

1. Connect posts to stair framing by direct welding unless otherwise indicated.
2. For nongalvanized railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

H. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal stairs after assembly.

C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

D. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.

D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.

Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

F. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.

G. Place and finish concrete fill for treads and platforms to comply with Section 033000 "Cast-in-Place Concrete."

H. Install precast concrete treads with adhesive supplied by manufacturer.

3.2 INSTALLING RAILINGS

A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:

1. Anchor posts to steel by welding directly to steel supporting members.

B. Attach handrails to wall with wall brackets. Use type of bracket with predrilled hole for exposed bolt anchorage. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:

1. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated on the percent complete to one decimal point (such as 7.5%).

3. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
4. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to MaineDOT, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

   a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
   b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
   c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 05 51 00

SECTION 05 53 00 - METAL GRATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section Includes:

1. Metal bar gratings.
2. Metal frames and supports for gratings.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design gratings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Vehicular Driveways, Subject to Trucking: Uniform load of 250 lbf/sq. ft. or concentrated load of 8000 lbf, whichever produces the greater stress.
2. Limit deflection to L/360 or 1/4 inch, whichever is less.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Clips and anchorage devices for gratings.

B. Shop Drawings: Include plans, sections, details, and attachments to other work.

C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with gratings by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for gratings, grating frames, and supports. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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:

1. Metal Bar Gratings:

a. McNichols Co.
b. Ohio Gratings, Inc.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Bars for Bar Gratings: ASTM A 36/A 36M or steel strip, ASTM A 1011/A 1011M or ASTM A 1018/A 1018M.

C. Wire Rod for Bar Grating Crossbars: ASTM A 510.

D. Uncoated Steel Sheet: ASTM A 1011/A 1011M, structural steel, Grade 30.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners. Select fasteners for type, grade, and class required.

B. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts, and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.

C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

D. Plain Washers: Round, ASME B18.22.1.

E. Lock Washers: Helical, spring type, ASME B18.21.1.

F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy that is welded.

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.5 FABRICATION

A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.

D. Fit exposed connections accurately together to form hairline joints.

E. Welding: Comply with AWS recommendations and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.

1. Fabricate toeplates to fit grating units and weld to units in shop unless otherwise indicated.
2. Fabricate toeplates for attaching in the field.
3. Toeplate Height: 4 inches unless otherwise indicated.

2.6 METAL BAR GRATINGS

A. Welded Steel Grating: 1-1/2 x 5/16 inch, 19W4 Heavy Duty (H-20) Decking.

1. Bearing Bar Spacing: As required to comply with structural performance requirements.
2. Bearing Bar Depth: 1-1/2 inches.
3. Bearing Bar Thickness: 5/16 inch.
4. Crossbar Spacing: 4 inches o.c.
5. Traffic Surface: Smooth.
6. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. of coated surface.

B. Removable Grating Sections: Fabricate with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated or, if not indicated, as recommended by manufacturer for attaching to supports.

1. Provide no fewer than four saddle clips for each grating section composed of rectangular bearing bars 3/16 inch or less in thickness and spaced 15/16 inch or more o.c., with each clip designed and fabricated to fit over two bearing bars.
2. Furnish stainless flange clamp with stainless steel bolt for securing grating to supports. Furnish as a system designed to be installed from above grating by one person.

C. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.

1. Edge-band openings in grating that interrupt four or more bearing bars with bars of same size and material as bearing bars.

D. Do not notch bearing bars at supports to maintain elevation.

2.7 GRATING FRAMES AND SUPPORTS

A. Frames and Supports for Metal Gratings: Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.

1. Unless otherwise indicated, fabricate from same basic metal as gratings.
2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.

B. Galvanize steel frames and supports.

2.8 STEEL FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish gratings, frames, and supports after assembly.

C. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing gratings to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.

D. Fit exposed connections accurately together to form hairline joints.

1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

3.2 INSTALLING METAL BAR GRATINGS

A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.

B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.

3.3 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated on the percent complete to one decimal point (such as 7.5%).
3. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
4. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to MaineDOT, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 05 53 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Rooftop equipment bases and support curbs.
4. Wood blocking and nailers.
5. Plywood backing panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Engineered wood products.
4. Shear panels.
5. Metal framing anchors.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. 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.
4. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

C. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, 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.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-

test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
3. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by testing agency.

E. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings, and the following:

1. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Load-Bearing, Joists, Rafters, Nailers for Steel Beams, Structural Blocking, and Other Framing: No. 2 grade or better.

1. Species:

a. Douglas Fir, Douglas Fir-Larch.
b. Spruce-pine-fir; NLGA.

2. Spruce-pine-fir (South) is not acceptable, except where pressure-treated materials are indicated.

2.5 ENGINEERED WOOD PRODUCTS

A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

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

a. Boise Cascade Corporation.
b. Georgia-Pacific.
c. Louisiana-Pacific Corporation.
d. Weyerhaeuser Company.

2.6 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Non-structural blocking.
2. Rooftop equipment bases and support curbs.
3. Cants.
4. Furring.
5. Grounds.
6. Utility shelving.

B. For items of dimension lumber size, provide No. 2 grade lumber and any of the following species:

1. Spruce-pine-fir; NLGA.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.7 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exterior, AC, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.8 FASTENERS

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

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

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

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.9 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Simpson Strong-Tie Co., Inc.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of basis-of-design products. 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.

C. Materials:

1. Interior Locations: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G90 coating designation.
2. Exterior Locations: Type 410 stainless steel.
3. Interior Contact with Pressure-Treated Wood: A-Max G185 coating or better.

2.10 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. 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 needed for accurate fit. Locate furring, nailers, blocking,and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

G. Do not splice structural members between supports unless otherwise indicated.

H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

I. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- thickness.

3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

J. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

K. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following, unless shown otherwise on the drawings:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

L. Use steel common nails with diameters as shown on the drawings unless otherwise indicated. 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. Drive nails snug but do not countersink nail heads unless otherwise indicated.

M. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Comply with indicated fastener patterns where applicable.
2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

3.3 WALL AND PARTITION FRAMING INSTALLATION

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.

1. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.

B. Construct corners and intersections with three or more studs, except that two studs may be used for interior non-load-bearing partitions.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

3.4 RAFTER FRAMING INSTALLATION

A. Rafters: Use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

B. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

   a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.

b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.

c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 06 10 00

SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes the following:

1. Wall sheathing.
2. Sheathing joint-and-penetration treatment.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

A. Plywood: DOC PS 1.

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.2 WALL SHEATHING

A. Plywood Wall Sheathing: Exposure 1, Structural I (CDX) sheathing.

1. Span Rating: Not less than 24/0 or 32/16.
2. Nominal Thickness: As indicated on the drawings.

B. Interior Plywood Wall Sheathing: DOC PS 1, Exterior, A-C Plugged.

1. Nominal Thickness: As indicated on the drawings.

C. Gypsum Wall Sheathing: Contractor has the option of using any of the following products:

1. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

a. 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:

1) GlasRoc Sheathing; CertainTeed (BPB America, Inc.)
2) Dens-Glass Gold; Georgia-Pacific Corporation.
3) E2XP Extended Exposure Sheathing; Gold Bond.
4) Securock Sheathing; United States Gypsum Co.

b. Type and Thickness: Regular, 1/2 inch thick.

2.3 UNDERLAYMENT

A. Underlayment, General: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.

B. Plywood Underlayment: DOC PS 1, Exterior, A-C Plugged.

2.4 FASTENERS

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

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing less than 0.0329 inch thick, attach sheathing to comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, attach sheathing to comply with ASTM C 954.

2.5 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. General: If required by the selected Air Barrier manufacturer, provide the following joint sealant:

B. Sealant for Glass-Mat Gypsum Sheathing Board: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated, and complying with requirements for elastomeric sealants specified in Division 07 Section "Joint Sealants."

1. Available Product: 895 Silicone building Sealant by Pecora Corporation.

C. Sheathing Tape for Glass-Mat Gypsum Sheathing Board: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing board and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following, unless shown otherwise on the drawings:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

D. Use common wire nails, unless otherwise indicated. 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. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Wall Sheathing:

   a. Nail to wood framing.
   b. Screw to cold-formed metal framing.
   c. Space panels 1/8 inch apart at edges and ends.

2. Underlayment: Install in accordance with manufacturer’s recommendations.

   a. Nail to subflooring, 2 inches on center along edges and 4 inches on center in the field.
   b. Butt panels together at edges and ends.
   c. Leave 1/4 to 1/2inch gap at walls.
   d. Fill and sand edge joints of underlayment receiving resilient flooring right before installing flooring.

3.3 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to cold-formed metal framing with screws.
2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing boards but do not cut into facing.

C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

D. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient quantity of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing board joints, and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.
3. Apply sheathing tape to joints between foam-plastic sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated on the percent complete to one decimal point (such as 7.5%).
3. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
4. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to MaineDOT, and consent of surety to payment, for stored materials.

2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 06 16 00

SECTION 06 20 23 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior standing and running trim.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

B. Samples for Selection:

1. For each species and cut of lumber and panel products with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. for lumber and 8 by 10 inches for panels.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation within and around stacks and under temporary coverings.

B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and the following grading rules:

1. NeLMA: Northeastern Lumber Manufacturers' Association, "Standard Grading Rules for Northeastern Lumber."

B. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

2.2 INTERIOR TRIM

A. Lumber Trim for Opaque Finish (Painted):

1. Species and Grade: Eastern white pine, Finish or No. 2; NeLMA or NLGA.
2. Maximum Moisture Content: 10 percent.
3. Finger Jointing: Allowed.
4. Face Surface: Surfaced (smooth).

2.3 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

B. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.

1. Use adhesive that has a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 FABRICATION

A. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 STANDING AND RUNNING TRIM INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
2. Install trim after gypsum board joint finishing operations are completed.

3.2 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.3 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

A. Protect installed products from damage from weather and other causes during remainder of the construction period.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated on the percent complete to one decimal point (such as 7.5%).
3. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
4. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to MaineDOT, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

   a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
   b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
   c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 06 20 23

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. This Section includes the following:

1. Plastic-laminate cabinets.
2. Plastic-laminate countertops.
3. Solid-surfacing-material countertops.

1.3 ACTION SUBMITTALS

A. Product Data: For panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, cabinet hardware and accessories.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.

C. Samples for Selection:

1. Plastic laminates.
2. Thermoset decorative panels.
3. Solid-surfacing materials.
4. Exposed cabinet hardware and accessories, one unit for each type and finish.

1.4 QUALITY ASSURANCE

A. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products: Comply with the following:

1. Particleboard: ANSI A208.1, Grade M-2.

C. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:

a. Formica Corporation.
b. Lamin-Art, Inc.
c. Nevamar Company, LLC; Decorative Products Div.
d. Panolam Industries International Incorporated. (Pionite)
e. Westinghouse Electric Corp.; Specialty Products Div.
f. Wilsonart International; Div. of Premark International, Inc.

E. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.

1. 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:

a. Avonite, Inc.
b. E. I. du Pont de Nemours and Company.
c. Formica Corporation.
d. Nevamar Company, LLC; Decorative Products Div.
e. Swan Corporation (The).
f. Wilsonart International; Div. of Premark International, Inc.

2. Type: Standard type, unless Special Purpose type is indicated.
3. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening, self-closing.

1. Available Products:

a. Blum: BH75T1550.
b. Grass: GHA3703M.
c. MEPLA: CS04 (MH146304550015).

C. Pulls: Drawer Pull by Brunner Enterprises, Inc.; anodized aluminum finish.

D. Shelf Rests: BHMA A156.9, B04013; plastic, two-pin type with shelf hold-down clip.

1. Plastic double pin shelf clip: Provide 1/4 inch diameter hole, clear or white color as selected by the Architect.

a. Available Products:

1) Hardware Concepts, Inc.: Series 5033.
2) AllenField: No. 55 Double Pin.

E. Drawer Slides: BHMA A156.9, B05091; Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.

1. Available Products:

a. Grass 6610
b. Mepla-Alfit: AL 5300.
c. KV 8417.
d. Blum 430E Series.

F. Counter Support Brackets: Provide one of the following

1. Heavy gage aluminum angle, MIG welded corners, 5/16 inch holes for mounting, and primed finish for field painting. Provide Rakks Counter Support, Model No. EH-1818, by Ragine Corporation (800-826-6006) or approved substitution.
2. 1/8 inch thick steel bracket with powder coat finish. Provide Work Station Brackets by A & M Hardware, Inc. (888-647-0200) or approved substitute.
3. 18-1/8 inch Inter-Arc Work Support, model SWS2 by Doug Mockett, Manhattan Beach, California. Matte Black or Metallic Silver finish.
4. Short Run Pro, 18 by 18 countertop bracket (LBRKT-7CRS 4802-50036 or 18 by 24 countertop bracket (LBRKT 7CRS 4802-56037. Provide white powder coat finish.

G. ADA Counter Support Brackets: Provide the following:

1. Heavy gage aluminum angle, MIG welded corners, 5/16 inch holes for mounting, and primed finish for field painting. Provide Rakks EHV Vanity Bracket, 18 by 21-1/2 inch, by Ragine Corporation (800-826-6006) or approved substitution.

H. Grommets for Cable Passage through Countertops: 3-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Product: Provide No. 35-3" by Outwater Plastics, Woodridge, NJ, (800) 631-8375.

I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
2. Satin Stainless Steel: BHMA 630.

J. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.3 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

D. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Contact Adhesive: 250 g/L.

E. Adhesive for Bonding Plastic Laminate: Contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.4 PLASTIC-LAMINATE CABINETS

A. Grade: Custom, unless noted otherwise.

B. AWI Type of Cabinet Construction: Flush overlay without face frame.

C. Component Materials:

1. Body members - ends, bottom, divisions, rails and tops: .028" exterior laminate over 3/4 inch thick particleboard, interior Thermoset Decorative Overlay (melamine) with 3 mm PVC edging, all exposed and semi-exposed sides. Provide Type B or C flush joint for underside of wall cabinets as required by AWI 400-G-7.
2. Shelves: Minimum 3/4 inch thick particleboard, Thermoset Decorative Overlay (melamine) each side with 3 mm PVC edging. Provide material and thickness required to meet AWI 400-G-8.
3. Backs: 1/4 inch thick particleboard, Thermoset Decorative Overlay (melamine) each side.
4. Drawer sides, backs and subfronts: 1/2" hardwood plywood or solid lumber.
5. Drawer Bottoms: 1/4" hardwood plywood.
6. Drawer Fronts: .028" exterior laminate over 3/4 inch thick particleboard, interior Thermoset Decorative Overlay (melamine) with 3 mm PVC edging.
7. Premanufactured drawer systems: Drawer systems will be acceptable similar to Blum Metabox C-15 or approved equal.
8. Cabinet Doors: .028" exterior laminate over 3/4 inch thick particleboard, interior Thermoset Decorative Overlay (melamine) with 3 mm PVC edging.
9. Edging: Band all exposed edges with 3 mm PVC.
10. Base Toe Kick: Hardwood plywood.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from laminate manufacturer's full range in the following categories:

   a. Solid colors, matte finish.
   b. Patterns, matte finish.

2.5 PLASTIC-LAMINATE COUNTERTOPS

A. Grade: Premium.

B. High-Pressure Decorative Laminate Grade: HGS.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from manufacturer's full range in the following categories:

   a. Solid colors, matte finish.
   b. Patterns, matte finish.

D. Edge Treatment: As indicated.

E. Core Material: Particleboard.

F. Core Material at Sinks: Exterior-grade plywood.

G. Backer Sheet: Provide plastic-laminate backer sheet, Grade BKL, on underside of countertop substrate.

2.6 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Grade: Premium.

B. Solid-Surfacing-Material Thickness: [**1/2 inch**] [**3/4 inch**].

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:

1. As selected by Architect from manufacturer's full range.

D. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

1. Fabricate tops with shop-applied edges of materials and configuration indicated.
2. Fabricate tops with shop-applied backsplashes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.

G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
3. Secure backsplashes to walls with adhesive.
4. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."

H. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.2 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated on the percent complete to one decimal point (such as 7.5%).
3. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
4. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to MaineDOT, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 06 40 23

SECTION 06 64 00 - PLASTIC PANELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. State of Maine Department of Transportation, "Standard Specifications," Revision December 2002, and any corrections, additions and revisions thereto, apply to this Section. If the Contractor discovers any ambiguity, error, omission, conflict, or discrepancy, Section 10 1. 3.6 Priority of Conflicting Contract Documents shall control.

1. Drawings and general provisions of the Contract, and Division 1 Specification Sections, apply to this Section.
2. Any supplements to any of the above specifications and or standards issued prior to issuance of this Project Manual, apply to this section.

1.2 SUMMARY

A. Section includes glass-fiber reinforced plastic (FRP) wall paneling and trim accessories.

1.3 SUBMITTALS

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

B. Samples for Selection: For plastic paneling and trim accessories.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.
3. Testing Agency: UL.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC SHEET PANELING

A. General: Gelcoat-finished, glass-fiber reinforced plastic panels complying with ASTM D 5319 and having a Class A fire rating.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Crane Composites.; Glasbord Premium Wall Panels.

2. Nominal Thickness: Not less than 0.075 inch.
3. Surface Finish: Smooth .075.
4. Color: White.

2.2 ACCESSORIES

A. Trim Accessories: Manufacturer's standard two-piece, snap-on vinyl extrusions designed to cover edges of panels. Provide division bars, inside corners, and caps as needed to conceal edges.

1. Color: White.

B. Adhesive: Provide Titebond Solvent-based FRP adhesive.

C. Sealant: Single-component, mildew-resistant, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Division 07 Section "Joint Sealants."

1. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances that could impair bond of adhesive, including oil, grease, dirt, and dust.

B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

1. Mark plumb lines on substrate at trim accessory locations for accurate installation.
2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.3 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Follow adhesive manufacturer's recommendations for appropriate height of adhesive bead left by trowel. Use a "crosshatch" type pattern. Make sure adhesive extends to all edges of the panel. Adhesive should be applied directly to the back of the FRP panel.

C. Start in corner. Install one piece corner molding. Apply silicone sealant in molding. Slide panel into molding and withdraw 1/8" (3.2mm). This will provide the appropriate gap as recommended. Begin in corner nearest molding and with laminate roller begin rolling out towards the edge without the molding.

D. Continue rolling down and out working your way across the panel away from the previously installed panel or initial molding to remove all trapped air.

E. Install one piece division bar and caps or next molding by laying down bead of silicone sealant in molding and sliding onto the panel. Withdraw the molding 1/8" (3.2mm), again to provide proper spacing. The free edge of the molding may be tacked in place if preferred before installing the next panel.

F. Repeat the process working in one direction across the ceiling.

G. Apply silicone sealant in all moldings and around all panel edges, fasteners, and fixtures to provide a moisture proof installation.

H. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

PART 4 - PAYMENT PROCEDURES

4.1 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments. Payment shall be based on percentage of work completed and cost of materials and equipment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Payment will be made according to Percent complete, so all dollar amounts for payment should be calculated on the percent complete to one decimal point (such as 7.5%).
3. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
4. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

B. Stored Materials: Include in Application for Payment amounts applied for acceptable, non-perishable materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to MaineDOT, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

END OF SECTION 06 64 00