PROJECT MANUAL

March 6, 2020

RIDOT
MIDDLETOWN
MAINTENANCE FACILITY
MIDDLETOWN, RHODE ISLAND

SACCOCCIO & ASSOCIATES
ARCHITECTS

1085 PARK AVENUE
CRANSTON, RHODE ISLAND

PROJECT NUMBER 19057

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INFORMATION FOR BIDDERS

A. GEOTECHNICAL DATA

A copy of the Geotechnical Boring Data with respect to the project site is included in this section.

A. HAZARDOUS MATERIAL TESTING REPORT:

The existing buildings have been tested for hazardous materials and no asbestos containing material has been detected. The Hazardous Materials Inspection Report is included in this section.

END OF DOCUMENT

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19.0150

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment Systems Program

SHT. 1 OF 3

Site Evaluation Form
Part A – Soil Profile Description

Application Number —

Property Owner: STATE OF RI (RIDOT)
Property Location: 122 WYATT RD., MIDDLETOWN
Date of Test Hole: 2-14-20
Soil Evaluator: K. HINGORANY
License Number:
Weather: CLEAR
Shaded: Yes ☐ No ☒
Time: 10:00

TH 1 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Ab. S. Contr.	Texture	Structure	Consistence	Soil Category
FILL	0 24	—	—	—	—	—	—	—	—	—
C	24 34	C	S	6/3	—	—	SIL	Sbk	Fi	9

TH 2 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Ab. S. Contr.	Texture	Structure	Consistence	Soil Category
FILL	0 24	—	—	—	—	—	—	—	—	—
Bw	24 30	C	S	10YR 6/2	—	—	SIL	Sbk	Fi	9
C	30 48	C	S	10YR 6/3	—	—	SIL	Sbk	Fi	9

TH 1 Soil Class A Total Depth 34 Impervious/Limiting Layer Depth 34 (og) GW Seepage Depth — SHWT — (og)

TH 2 Soil Class A Total Depth 48 Impervious/Limiting Layer Depth 48 (og) GW Seepage Depth — SHWT — (og)

Comments: LIMIT OF EXPLORATION WAS 48" FOR FOUNDATION
TH# POSSIBLE BOULDER ENCOUNTERED AT 34"

* BEARING CAPACITY (PER RIBC PRESORTLE) IS 2000 PSF IN C HORIZON.

Revised 11/25/18

19.0156

Part B

2 OF 3

Site Evaluation – to be completed by Soil Evaluator or Class II or III Designer

Please use the area below to locate:

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*

***OFFSETS MUST BE SHOWN**

Key:
- Approximate location of test holes
- Approximate location of bedrock test holes
- x% Estimated gradient and direction of slope
- N Approximate direction of due north

SEE ATTACHMEN

Bedrock THs	
TH	Depth

1. Relief and Slope: N/A
2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch. NO ☐ YES ☐
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above. NO ☐ YES ☐
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch. NO ☐ YES ☐
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch. NO ☐ YES ☐
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 6.42? NO ☐ YES ☐
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch. NO ☐ YES ☐

N/A

8. Site's potential for flooding or ponding: NONE ☒ SLIGHT ☐ MODERATE ☐ SEVERE ☐
9. Landscape position:
10. Vegetation:
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site:

Certification

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: [signature] D4005 (Signature, License #) Part B prepared by: [signature] D4005 (Signature, License #)

DO NOT WRITE IN THIS SPACE

Witnessed Soil Evaluation Decision: Concur ☐ Inconclusive ☐ Disclaim ☐

Unwitnessed Soil Evaluations Decision: Accept ☐ Inconclusive ☐ Disclaim ☐

Wet Season Determination required ☐ Additional Field Review Required ☐

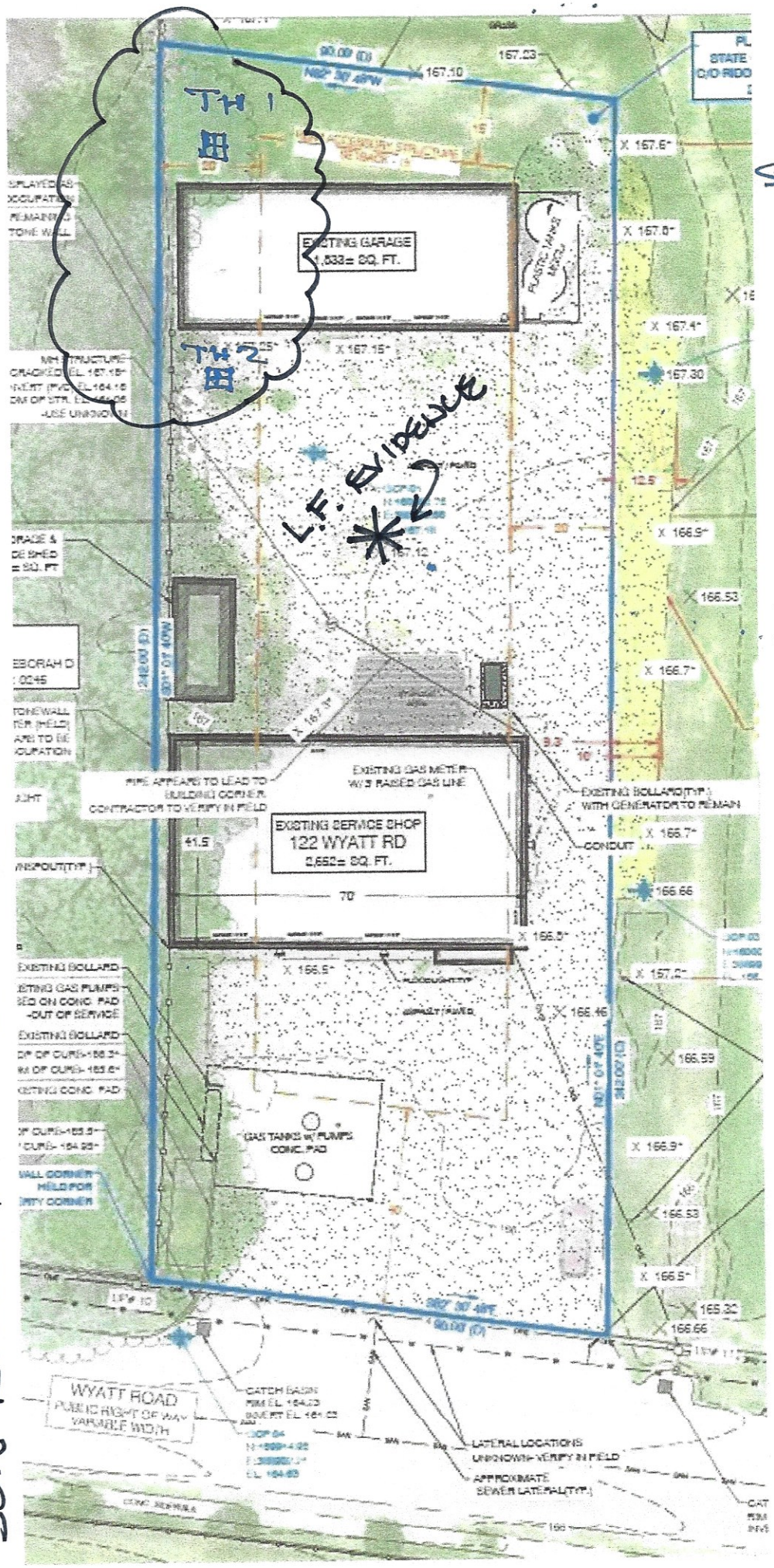
Explanation:

Signature Authorized Agent Date

Revised 11/25/18

19.0156

SHEET 3 OF 3



SOIL EVALUATION SK. FEB 20

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April 7, 2020

Ri Department of Transportation
Attn: Mr. Scott Graham
360 Lincoln Ave
Warwick, RI 02888

Re: 122 Wyatt Road – Asbestos Demolition Inspection of DOT Garage and Shed.

Mr. Graham:

Enclosed are the analytical results of the asbestos bulk samples collected by Environmental Consulting and Management (ECM) from the garage building and storage shed located at 122 Wyatt Road in Middletown, RI. Samples were collected to verify asbestos containing materials prior to the planned demolition of the structure.

Suspect materials were analyzed for asbestos content utilizing Polarized Light Microscopy (PLM) in accordance with Environmental Protection Agency (EPA) method 600/R-93/116. In addition to collection, location and quantity of identified materials has also been denoted within this report. Please refer to **Attachment 1** for the analytical results.

122 Wyatt Road Shed and Garage Building– Asbestos Bulk Sample Results

Sample #	Material	Location	Asbestos %	Quantity
1A-1B	Window Glazing	Shed Building	None Detected	NA
2A-C	Roofing	Shed Roof	None Detected	NA
3A-E	Garage-Roofing	Garage (3 Bay)	None Detected	NA

Asbestos Conclusion:

All suspect asbestos containing material sampled from the Garage Building and the Storage Shed has been shown to be none detected for asbestos.

These buildings can be demolished without asbestos hazard.

181 Amaral Street
Riverside, RI 02915

O: 401.438.1360
F: 401.438.1316

www.ecmne.com

Limitations:

Environmental Consulting and Management cannot be held responsible for the identification of materials that are hidden, concealed or otherwise inaccessible.

This report was prepared under the request of RI Department of Transportation. This report should not be represented, reproduced, or disseminated without the written approval of Environmental Consulting and Management or RI Department of Transportation. No warranties other than those expressed in the contract for this project are expressed or implied.

A hard copy of this report can be provided for your records via mail upon request. If you have any further questions feel free to contact myself at 401-304-6614.

Sincerely,
Environmental Consulting & Management

Joseph M. Lepore
Project Manager
RI Asbestos Inspector # AI00661

Attachment 1
Asbestos Bulk Sample Results

181 Amaral Street
Riverside, RI 02915

O: 401.438.1360
F: 401.438.1316

www.ecmne.com

SanAir Technologies Laboratory

The Identification Specialists

Analysis Report
prepared for
Environmental Consulting & Management Inc

Report Date: 4/6/2020

Project Name: 122 Wyatt Rd

Project #: 200284

SanAir ID#: 20015181

NVLAP TESTING

NVLAP LAB CODE 200870-0

1551 Oakbridge Dr. Suite B | Powhatan, Virginia 23139-8061
888.895.1177 | 804.897.1177 | fax: 804.897.0070 | IAQ@SanAir.com | SanAir.com

SanAir ID Number
20015181
FINAL REPORT
4/6/2020 11:50:19 AM

Name: Environmental Consulting & Management Inc
Address: 50 Kickemuit Ave
Bristol, RI 02809
Phone: 401-438-1360

Project Number: 200284
P.O. Number:
Project Name: 122 Wyatt Rd
Collected Date: 4/1/2020
Received Date: 4/3/2020 9:50:00 AM

Dear Joseph M. Lepore,

We at SanAir would like to thank you for the work you recently submitted. The 10 sample(s) were received on Friday, April 03, 2020 via FedEx. The final report(s) is enclosed for the following sample(s): 1A, 1B, 2A, 2B, 2C, 3A, 3B, 3C, 3D, 3E.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

Sandra Sobrino

Sandra Sobrino
Asbestos & Materials Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:
- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

Sample conditions:
- 10 samples in Good condition.

SanAir Technologies Laboratory

SanAir ID Number
20015181
FINAL REPORT
4/6/2020 11:50:19 AM

Name: Environmental Consulting & Management Inc
Address: 50 Kickemuit Ave
Bristol, RI 02809
Phone: 401-438-1360

Project Number: 200284
P.O. Number:
Project Name: 122 Wyatt Rd
Collected Date: 4/1/2020
Received Date: 4/3/2020 9:50:00 AM

Analyst: Cameron, Dennis

Asbestos Bulk PLM EPA 600/R-93/116

	Stereoscopic	Components		
SanAir ID / Description	Appearance	% Fibrous	% Non-fibrous	Asbestos Fibers
1A / 20015181-001 Window Glazing-Shed	White Non-Fibrous Homogeneous		100% Other	None Detected
1B / 20015181-002 Window Glazing-Shed	White Non-Fibrous Homogeneous		100% Other	None Detected
2A / 20015181-003 Roofing-Shed	Black Fibrous Homogeneous	50% Cellulose	50% Other	None Detected
2B / 20015181-004 Roofing-Shed	Black Fibrous Homogeneous	50% Cellulose	50% Other	None Detected
2C / 20015181-005 Roofing-Shed	Black Fibrous Homogeneous	50% Cellulose	50% Other	None Detected
3A / 20015181-006 Roofing-Garage	Various Non-Fibrous Heterogeneous	15% Glass	85% Other	None Detected
3B / 20015181-007 Roofing-Garage	Various Non-Fibrous Heterogeneous	15% Glass	85% Other	None Detected
3C / 20015181-008 Roofing-Garage	Various Non-Fibrous Heterogeneous	15% Glass	85% Other	None Detected
3D / 20015181-009 Roofing-Garage	Various Non-Fibrous Heterogeneous	15% Glass	85% Other	None Detected
3E / 20015181-010 Roofing-Garage	Various Non-Fibrous Heterogeneous	15% Glass	85% Other	None Detected

Analyst: Dennis Cameron

Approved Signatory: Johnathan Wilson

Analysis Date: 4/6/2020

Date: 4/6/2020

Disclaimer

The final report cannot be reproduced, except in full, without written authorization from SanAir. Fibers smaller than 5 microns cannot be seen with this method due to scope limitations. The accuracy of the results is dependent upon the client's sampling procedure and information provided to the laboratory by the client. SanAir assumes no responsibility for the sampling procedure and will provide evaluation reports based solely on the sample and information provided by the client. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Samples are held for a period of 60 days.

For NY state samples, method EPA 600/M4-82-020 is performed.

Polarized- light microscopy is not consistently reliable in detecting asbestos in floor covering and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

Asbestos Certifications
NVLAP lab code 200870
City of Philadelphia: ALL-460
PA Department of Environmental Protection Number: 68-05397
California License Number: 2915
Colorado License Number: AL-23143
Connecticut License Number: PH-0105
Massachusetts License Number: AA000222
Maine License Number: LB-0075
New York ELAP lab ID: 11983
Rhode Island License Number: AAL-126
Texas Department of State Health Services License Number: 300440
Commonwealth of Virginia 3333000323
Washington State License Number: C989
West Virginia License Number: LT000566
Vermont License: AL166318

Revision Date: 11/30/2017

SanAir Technologies Laboratory
1551 Oakbridge Dr. STE B
Powhatan, VA 23139
804.897.1177 / 888.895.1177
Fax 804.897.0070
sanair.com

Asbestos Chain of Custody

Form 140, Rev 1, 1/20/2017

SanAir ID Number: 20015181

Company:	Environmental Consulting & Management Inc	Project #: 200284	Collect by: Joe Lepore
Address:	50 Kickemuit Ave	Project Name: 122 Wyatt Rd	Phone #: 401-438-1360
City, St., Zip:	Bristol, RI 02809	Date Collected: 4-1-2020	Fax #: 401-438-1316
State of Collection: RI	Account#: 2667	P.O. Number:	Email: JLepore@ECMNE.com

Bulk

ABB	PLM EPA 600/R-93/116	☒
	Positive Stop ☐	
ABEPA	PLM EPA 400 Point Count	☐
ABB1K	PLM EPA 1000 Point Count	☐
ABBEN	PLM EPA NOB**	☐
ABBCH	TEM Chatfield**	☐
ABBTM	TEM EPA NOB**	☐
ABQ	PLM Qualitative	☐

** Available on 24-hr. to 5-day TAT

Air

ABA	PCM NIOSH 7400	☐
ABA-2	OSHA w/ TWA*	☐
ABTEM	TEM AHERA	☐
ABATN	TEM NIOSH 7402	☐
ABT2	TEM Level II	☐
Other:		☐

New York ELAP

PLM NY	PLM EPA 600/M4-82-020	☐
ABEPA2	NY ELAP 198.1	☐
ABENY	NY ELAP 198.6 PLM NOB	☐
ABBNY	NY ELAP 198.4 TEM NOB	☐

Soil

ABSE	PLM EPA 600/R-93/116 (Qual.)	☐

Vermiculite & Soil

ABSP	PLM CARB 435 (LOD <1%)	☐
ABSP1	PLM CARB 435 (LOD 0.25%)	☐
ABSP2	PLM CARB 435 (LOD 0.1%)	☐

Dust

ABWA	TEM Wipe ASTM D-6480	☐
ABDMV	TEM Microvac ASTM D-5755	☐

Water

ABHE	EPA 100.2	☐

Matrix	Other	
		☐

Turn Around Times	3 HR (4 HR TEM) ☐	6 HR (8HR TEM) ☐	12 HR ☐	24 HR ☐
	☐ 2 Days	☐ 3 Days	☐ 4 Days	☒ 5 Days

Special Instructions

Sample #	Sample Identification/Location	Volume or Area	Sample Date	Flow Rate*	Start – Stop Time*	
1A	Window Glazing - shed					
1B	" "					
2A	Roofing - shed					
2B	↓					
2C						
3A	Roofing - Garage					
3B	↓					
3C						
3D						
3E						

Relinquished by	Date	Time	Received by	Date	Time
[signature]	4/2/2020	9:30AM	[signature]	APR 03 2020	9:50am

If no technician is provided, then the primary contact for your account will be selected. Unless scheduled, the turnaround time for all samples received after 3 pm EST Friday will begin at 8 am Monday morning. Weekend or holiday work must be scheduled ahead of time and is charged for rush turnaround time. SanAir covers Standard Overnight FedEx shipping. Shipments billed to SanAir with a faster shipping rate will result in additional charges.

DOCUMENT 00 45 13

CONTRACTOR'S QUALIFICATION STATEMENT

AIA Document A305, Contractor's Qualification Statement - Electronic Format, 1986 Edition, is included, following this page, as an integral part of the Bid documents, for use in evaluating the qualifications of Contractors.

The numerical low bidder will be required to complete and submit this form for evaluation.

END OF DOCUMENT

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AIA® Document A305™ – 1986

Contractor's Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO:

ADDRESS:

SUBMITTED BY:

NAME:

ADDRESS:

PRINCIPAL OFFICE:

[ ] Corporation
[ ] Partnership
[ ] Individual
[ ] Joint Venture
[ ] Other

NAME OF PROJECT: *(if applicable)* State House Elevator Modernization

TYPE OF WORK: *(file separate form for each Classification of Work)*

[ ] General Construction
[ ] HVAC
[ ] Electrical
[ ] Plumbing
[ ] Other: *(Specify)*

§ 1 ORGANIZATION

§ 1.1 How many years has your organization been in business as a Contractor?

§ 1.2 How many years has your organization been in business under its present business name?

§ 1.2.1 Under what other or former names has your organization operated?

§ 1.3 If your organization is a corporation, answer the following:

§ 1.3.1 Date of incorporation:
§ 1.3.2 State of incorporation:
§ 1.3.3 President's name:
§ 1.3.4 Vice-president's name(s)

§ 1.3.5 Secretary's name:

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This form is approved and recommended by the American Institute of Architects (AIA) and The Associated General Contractors of America (AGC) for use in evaluating the qualifications of contractors. No endorsement of the submitting party or verification of the information is made by AIA or AGC.

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User Notes: (3B9ADA2D)

§ 1.3.6 Treasurer's name:

§ 1.4 If your organization is a partnership, answer the following:

§ 1.4.1 Date of organization:

§ 1.4.2 Type of partnership (if applicable):

§ 1.4.3 Name(s) of general partner(s)

§ 1.5 If your organization is individually owned, answer the following:

§ 1.5.1 Date of organization:

§ 1.5.2 Name of owner:

§ 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

§ 2 LICENSING

§ 2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

§ 2.2 List jurisdictions in which your organization's partnership or trade name is filed.

§ 3 EXPERIENCE

§ 3.1 List the categories of work that your organization normally performs with its own forces.

§ 3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)

§ 3.2.1 Has your organization ever failed to complete any work awarded to it?

§ 3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

§ 3.2.3 Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

§ 3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

§ 3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

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User Notes: (3B9ADA2D)

§ 3.4.1 State total worth of work in progress and under contract:

§ 3.5 On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

§ 3.5.1 State average annual amount of construction work performed during the past five years:

§ 3.6 On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

§ 4 REFERENCES

§ 4.1 Trade References:

§ 4.2 Bank References:

§ 4.3 Surety:

§ 4.3.1 Name of bonding company:

§ 4.3.2 Name and address of agent:

§ 5 FINANCING

§ 5.1 Financial Statement.

§ 5.1.1 Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;

Other Assets;

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

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User Notes: (3B9ADA2D)

§ 5.1.2 Name and address of firm preparing attached financial statement, and date thereof:

§ 5.1.3 Is the attached financial statement for the identical organization named on page one?

§ 5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

§ 5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

§ 6 SIGNATURE

§ 6.1 Dated at this day of

Name of Organization:

By:

Title:

§ 6.2

M being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this day of

Notary Public:

My Commission Expires:

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User Notes: (3B9ADA2D)

DOCUMENT 00 52 13

AGREEMENT FORM

AIA Document A101 Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum - 2017 Edition, and as amended, forms the basis of Contract between the Owner and Contractor, and is included, following this page, as an integral part of the Bid documents. Provisions that are not amended or supplemented remain in full force and effect.

END OF DOCUMENT

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DRAFT

AIA® Document A101™ – 2017
Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)
BETWEEN the Owner:
(Name, legal status, address, telephone and facsimile numbers, and website)

«State of Rhode Island, acting by and through the Department of Administration, Division of Purchases, on behalf of the User Agency»
«One Capitol Hill, Second Floor»
«Providence, Rhode Island 02908-5855»
«401.578.8100 (telephone); 401.574.8387 (facsimile)»
«www.puchasing.ri.gov»

on behalf of the User Agency:
(Name, legal status, address, telephone and facsimile numbers, and website)

«R.I. Department of Transportation»
«Two Capitol Hill»
«Providence RI 02903»
«Tel. 401 222-2450»
Fax. 401 222-3905
»

and the Contractor:
(Name, legal status, address, telephone and facsimile numbers, and website)
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«Maintenance Facility
RIDOT - Middletown»
«122 Wyatt Road
Middletown, Rhode Island 02842»
« Work of the Project includes the demolition of two buildings at the site, exterior renovations to an existing building and construction of a new garage. »

The Design Agent:
(Name, legal status, address, telephone and facsimile numbers, and website)

«Saccoccio & Associates Architects»
«1085 Park Ave, Cranston, RI 02910»
«Tel. 401 942-7970 »
«Fax. 401 942-7975»
«www.sa-architects.com »

The Owner and Contractor agree as follows.

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EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General Conditions, Supplementary Conditions (if any), and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. No part of the Work shall be performed by Subcontractors without the Owner's prior written consent.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the later of: (i) the issuance of the Purchase Order by the Owner; and (ii) the date set forth in a notice to proceed issued by the User Agency.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

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Portion of Work	Substantial Completion Date
« »	

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. Subject to additions and deductions as provided in the Contract Documents, the Contract Sum shall be: $_____.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
« »	

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
« »		

§ 4.3 Allowances, if any, are specified in the Bid Proposal Form and are included in the Contract Sum.

§ 4.4 Unit prices, if any, are specified in the Bid Proposal Form and include all costs, including without limitation, labor, materials, services, regulatory compliance, overhead, and profit necessary for the completion of the Work. Unit prices shall be used for both additions to, and deletions from the Work.

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

«**.1** In the event that there is one date for Substantial Completion of the Work, the Contractor shall pay the Owner the sum stipulated in this Section 4.5.1 as liquidated damages, and not as a penalty, for each calendar day of delay until the Work is substantially complete: $_____.

.2 In the event that the Project is scheduled to be completed in phases, and there is more than one date for Substantial Completion of the Work, the Contractor shall pay the Owner an aggregate amount equal to the sums stipulated in this Section 4.5.2 as liquidated damages, and not as a penalty, for each calendar day of delay until the Work for each phase is substantially complete:

Phase	Liquidated Damages Sum

.3 The Owner and the Contractor have reasonably determined the sums set forth in this Section 4.5 to be a fair estimate of the Owner' actual damages which are difficult to ascertain in the event of delay.»

§ 4.6 Other:

The Owner shall not be liable to the Contractor or any Subcontractor for claims or damages of any nature caused by or arising out of any delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work.

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User Notes: (3B9ADA24)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Design Agent by the Contractor and Certificates for Payment issued by the Design Agent and approved by the Owner in writing, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 The Owner shall make payment of the certified amount, less retainage, to the Contractor not later than the 30th working day following written approval by the Owner.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor and approved by the Design Agent and the Owner in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Design Agent and the Owner may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2007, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Design Agent determines, in the Design Agent's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Design Agent has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2007;
- **.3** For Work performed or defects discovered since the last payment application, any amount for which the Design Agent may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2007; and
- **.4** Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due: five (5%) percent.

§ 5.1.7.1.1 Deleted.

§ 5.1.7.2 Deleted.

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

(Insert any other conditions for release of retainage upon Substantial Completion.)

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The amount of five (5%) percent shall be retained by the Owner until the first anniversary of final completion of the Work.

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2007.

§ 5.1.9 Except with the Owner's prior written approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.1.10 Within 10 working days of receipt of any progress payment from the Owner, the Contractor must pay its Subcontractors the full amount included for each such Subcontractor within the Contractor's Application for Payment in accordance with the provisions of AIA A201 – 2007, General Conditions of the Contract for Construction.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, less the amount withheld pursuant to § 5.1.7.3, shall be made by the Owner to the Contractor when:

- **.1** the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- **.2** a final Certificate for Payment has been issued by the Design Agent and approved in writing by the Owner;
- **.3** the Contractor has submitted its final release and final releases from all of its Subcontractors and suppliers in a form acceptable to the Owner; and
- **4** the Contractor has submitted to the Owner all close-out documents, including without limitation, all as-built plans, warranties, manuals, and other materials set forth in the Contract Documents.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 working days after the issuance of the Design Agent's final Certificate for Payment and written approval by the Owner.

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due in accordance with the provisions of "Prompt Payment by Department of Administration," R.I. Gen. Laws §§ 42-11.1-1 et seq.

§ 5.4 Owner's Rights

§ 5.4.1 The Owner shall have the right to deduct from any payments due to the Contractor the amount of any unpaid obligations owed to the State of Rhode Island by the Contractor, including without limitation, any and all unpaid taxes, the amount of any claim against the Contractor arising out of this Agreement, or any amount on account of any other reason permitted by applicable law.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

Claims shall be referred to the Initial Decision Maker for initial decision. The Purchasing Agent appointed pursuant to the provisions of the "State Purchases Act," R.I. Gen. Laws § 37-2-1 et seq., will serve as the Initial Decision Maker in accordance with the provisions of the State Purchases Act, State of Rhode Island Procurement Regulations, and this Section 6.1. An initial decision shall be required as a condition precedent to binding dispute resolution pursuant to Section 6.3 of any Claim arising prior to the date final payment is due.

§ 6.2 Mediation

For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 6.1, and prior to the implementation of the binding dispute resolution procedures set forth in Section 6.3, the Contractor shall have the option to pursue mediation, exercisable by written notice to the Owner within 30 calendar days of an Initial Decision. In the event of the exercise of such option by the Contractor, the Owner and the Contractor shall attempt to select a mediator, and in the event that the Owner and the Contractor cannot agree on a mediator, either party may apply in writing to the Presiding Justice of the Providence County Superior Court, with a copy to the other, with a request for the court to appoint a mediator, and the costs of the mediator shall be borne equally by both parties.

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§ 6.3 Binding Dispute Resolution
For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 6.1, or mediation at the option of the Contractor pursuant to Section 6.2, the method of binding dispute resolution shall be determined in accordance with the provisions of the "Public Works Arbitration Act," R.I. Gen. Laws §§ 37-16-1 et seq.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007. The Contract may also be terminated by the Owner: (i) in the event of the unavailability of appropriated funds; (ii) in the absence of a determination of continued need; or (iii) as otherwise provided in the State of Rhode Island Procurement Regulations General Conditions of Purchase or other applicable law.

§ 7.1.1 Deleted.

§ 7.2 The Work may be suspended by the Owner as provided in: (i) the State of Rhode Island General Conditions of Purchase Regulation or other applicable law; or (ii) Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to: (i) the AIA Document A201 – 2007 or other Contract Document as modified by the Owner; and (ii) that provision in the AIA Document A201 – 2007 or other Contract Document as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Representatives for the Owner
§ 8.2.1 The Owner's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

§ 8.2.2 The User Agency's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

§ 8.2.3 The Design Agent's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

»

§ 8.3 The Contractor's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

« »
« »
« »
« »
« »
« »

§ 8.4 Neither the Owner's nor the Contractor's representative nor the Design Agent's representative shall be changed without 10 working days' prior notice to the other party.

§ 8.5 Insurance and Bonds
§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in the Solicitation and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in the Solicitation and elsewhere in the Contract Documents.

§ 8.6 Deleted.

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§ 8.7 Other provisions:
§ 8.7.1 The Contractor represents and warrants to the Owner, in addition to any other representations and warranties of the Contractor elsewhere in the Contract Documents:

.1 The Contractor and its Subcontractors are each financially solvent, able to pay their debts as they mature, and possess sufficient working capital to perform their obligations under the Contract Documents.
.2 The Contractor and its Subcontractors are each able to furnish the tools, materials, equipment, and labor required to complete the Project as required under the Contract Documents.
.3 The Contractor and each Subcontractor are authorized to do business in the State of Rhode Island and are properly licensed by all necessary governmental authorities having jurisdiction over them and over the Work and the Project.
.4 The execution of this Agreement and its performance is within its duly authorized powers.
.5 The Contractor has visited the site of the Project, familiarized itself with the local and special conditions under which the Work is to be performed, and correlated its observations with the requirements of the Contract Documents.
.6 The Contractor possesses the requisite level of experience and expertise in the business administration, construction, and superintendence of projects of the size, complexity, and nature of the Project, and it will perform the Work with the care, skill, and diligence of a contractor possessing such experience and expertise.

§ 8.7.2 The representations and warranties of the Contractor in this Section 8.7 and elsewhere in the Contract Documents will survive the execution and delivery of this Agreement, any termination of this Agreement, and the final completion of the Work.

§ 8.7.3 Any Change Orders or other Modifications must be approved in writing by the Owner.

§ 8.7.4 The Owner is the State of Rhode Island, acting by and through its Department of Administration, Division of Purchases, and therefore, pursuant to the provisions of R.I. Gen. Laws § 34-28-31, mechanics liens may not be placed against the Project.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, as modified by the Owner

.2 **Deleted.**

.3 AIA Document A201™–2007, General Conditions of the Contract for Construction, as modified by the Owner.

.4 **Deleted.**

.5 Drawings

The Drawings are included in the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.6 Specifications

The Specifications are included in the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.7 Addenda, if any, issued pursuant to the Solicitation form a part of the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.8 Supplementary and other Conditions of the Contract, including without limitation, the State of Rhode Island General Conditions of Purchase Regulation.

.9 Other documents listed below:

.1 The Solicitation, issued by the Owner, including without limitation, the Invitation to Bid, the

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Instructions to Bidders, the Specifications and Drawings, any Addenda, and the Bid Checklist.

.2 The Bid Proposal, including without limitation, the Bid Form and the Bidder Certification Cover Form.

.3 The Purchase Order issued by the Owner.

§ 9.2 This Agreement and the Contract Documents are subject to, and governed by, the laws of the State of Rhode Island, including all procurement statutes and regulations (available at www.purchasing.ri.gov), and applicable federal and local law, all of which are fully incorporated into this Agreement by this reference.

§ 9.3 In the event of any conflict between or among the Contract Documents, or any Contract Documents and any provision of the State of Rhode Island Procurement Regulations and/or any other provision of the Rhode Island General Laws, the State of Rhode Island Procurement Regulations and the Rhode Island General Laws shall control.

ARTICLE 10 BENEFITS OF AGREEMENT

§ 10.1 The User Agency is a disclosed third-party beneficiary of this Agreement and shall have all of the rights and benefits hereunder to which such a party is entitled. Nothing contained in this Agreement shall create a contractual relationship with, or a cause of action in favor of, any other third party against the Owner or the User Agency.

§ 10.2 This Agreement shall be binding on the Contractor and its successors and assigns; provided, however, that the Contractor may not assign its rights nor delegate its responsibilities under this Agreement without the Owner's prior written consent.

This Agreement is entered into as of the day and year first written above; provided, however, that this Agreement shall not become a valid, binding, and enforceable contract unless and until the Owner shall have issued a Purchase Order.

«**THE STATE OF RHODE ISLAND, acting by and through its Department of Administration, Division of Purchases**»	« »
OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
« »« »	« »« »
(Printed name and title)	*(Printed name and title)*

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DOCUMENT 00 65 19.16

WAIVER OF LIEN FORM

The Waiver of Lien Form is included, following this page, as an integral part of the Contract documents. A copy with completed information must be submitted with the second and each succeeding Application for Payment.

WAIVER OF LIEN FORM
Material or Labor

Construction Project Title: _____

General Contractor: _____

Subcontractor/Supplier: _____

General Contractor's previous Application No: _____
General Contractor's previous Application Date: _____

Schedule of Values Line Item No.: _____

DESCRIPTION OF WORK Heading: _____

Total payment Received to Date:
$ _____

The undersigned Representative of the above Subcontractor/Supplier has been contracted by the above General Contractor to furnish materials, or labor, or both, as included in the approved Schedule of Values under the Line Item No., and DESCRIPTION OF WORK heading indicated above, for the Construction Project listed above.

The undersigned acknowledges receipt of payment, under this Line Item No., and DESCRIPTION OF WORK heading, and hereby waives and releases any and all lien, or claim or right to lien, on the Construction Project listed above, and premises, under the statutes of the State of Rhode Island, relating to Mechanics Liens, on account of materials, or labor, or both, furnished, or which may be furnished, by the undersigned to, or on account of, the above numbered and dated Application and Certificate for Payment.

Signed this month of _____ day of _____, 20___.

_____
(signature)

_____
(company/firm name)

END OF DOCUMENT

DOCUMENT 00 65 19.18

AFFIDAVIT OF GENERAL CONTRACTOR THAT ALL SUBCONTRACTORS. SUPPLIERS AND LABORERS HAVE BEEN PAID AND HOLD HARMLESS CLAUSE

The affidavit is included, following this page, as an integral part of the bid documents, for submittal with all applications for payment.

DOCUMENT 00815

AFFIDAVIT OF GENERAL CONTRACTOR
THAT ALL SUBCONTRACTORS. SUPPLIERS AND LABORERS
HAVE BEEN PAID: AND HOLD HARMLESS CLAUSE

To: State of Rhode Island

The undersigned hereby deposes, says and makes affidavit under oath that he/she is _____ of _____ and further certifies that as of today's date all monies previously advanced pursuant to requisitions of the Contractor in connection with the Project known as RIDOT Middletown Maintenance Facility have been paid to or are being held for and will be paid to the subcontractors, laborers, or suppliers: that there are no further amounts owing to the knowledge of the undersigned other than as set forth in the current requisition, a copy of which is attached hereto, and that only materials, fixtures, and equipment to which undersigned has absolute title have been used in the project. Further, the undersigned HEREBY HOLDS HARMLESS THE State of Rhode Island, AND ALL COMMITTEES, BOARDS, DEPARTMENTS AND AGENCIES THEREUNDER, AND AGREES TO INDEMNIFY SAME FOR ANY ACTION OR SUIT BROUGHT BY ANY SUBCONTRACTOR, LABORER, OR SUPPLIER FOR THE PAYMENT OF ANY SUMS DUE RELATIVE TO The AFORESAID PROJECT. Said Hold Harmless Clause and Indemnification shall cause the undersigned to shield the State of Rhode Island and all committees boards, departments and agencies from all attachments, chattel mortgages, and all liens, whatsoever, sought by subcontractors, laborers and/or suppliers for collection of monies allegedly due said parties for work performed on the aforesaid Project.

On the _____ day of _____, 20___, before me appeared_____, where upon oath said property executed the foregoing Affidavit as their free act and deed.

NOTARY

My commission expires:

DOCUMENT 00 72 13

GENERAL CONDITIONS

AIA Document A201, General Conditions of the Contract for Construction - 2007 Edition, is included, following this page, as an integral part of the Bidding and Contract Documents. Provisions that are not amended or supplemented remain in full force and effect.

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DRAFT

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

Maintenance Facility
RIDOT - Middletown»
«122 Wyatt Road
Middletown, Rhode Island 02842»

THE OWNER:
(Name, legal status and address)

The State of Rhode Island, acting by and through the Department of Administration Division of Purchases, on behalf of the User Agency
One Capitol Hill, Second Floor
Providence, Rhode Island 02908-5855
(401) 574-8100 (telephone)
(401 574-8387 (facsimile)
www.purchasing.ri.gov

THE USER AGENCY

(Name, address, telephone and facsimile numbers, and web address)

«R.I. Department of Transportation»
«Two Capitol Hill»
«Providence RI 02903»
«Tel. 401 222-2450»
Fax. 401 222-3905

THE Design Agent:
(Name, legal status, address, telephone and facsimile numbers, and web address)

«Saccoccio and Associates Architects »
«1085 Park Avenue, Cranston RI 02910
Tel.-(401) 942-7970
Fax- (401)942- 7975
sa-architects.com »

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 DESIGN AGENT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

DRAFT

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (the Agreement) and consist of the Agreement (and the documents enumerated therein), Conditions of the Contract (General Conditions, Supplementary Conditions, if any, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Design Agent.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Design Agent or the Design Agent's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Design Agent or the Design Agent's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Design Agent shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Design Agent's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Design Agent and the Design Agent's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items and services necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; the Contractor shall perform all work reasonably inferable from the Contract Documents as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

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§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 In the event of any conflicts or discrepancies among the Contract Documents, the provisions of the Contract Documents will be interpreted in the following order of priority:

.1 Modifications (if any).
.2 The Purchase Order.
.3 The Agreement.
.4 The Solicitation, including any Addenda, and the Specifications and Drawings
.5 The Supplementary Conditions (if any).
.6 The General Conditions.
.7 The Bid Proposal.

§ 1.2.5 In the event of any conflicts or discrepancies between the Contract Documents and the State of Rhode Island Procurement Regulations or any provision of the Rhode Island General Laws, the State of Rhode Island Procurement Regulations and the Rhode Island General Laws will control.

§ 1.2.6 In the event of any inconsistency between the Drawings and Specifications, the better quality or greater quantity of Work shall be provided.

§ 1.2.7 The Owner will be the final decision maker for any and all interpretations.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Owner and the User Agency shall have a perpetual license to utilize the Drawings, Specifications, and other documents, including electronic or digital documents, prepared by the Design Agent and the Design Agent's consultants, for the execution of the Project and shall have and retain all rights to use them and reproduce them for the production and maintenance of the Work described therein. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Design Agent's or Design Agent's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Design Agent and the Design Agent's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization.

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Except as otherwise provided in Section 4.2.1, the Design Agent does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 Deleted.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER
§ 2.2.1 Deleted.

§ 2.2.2 The Contractor shall secure and pay for permits and fees, necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 If required for the Work in the discretion of the Owner, the Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of any information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Deleted.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK
If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK
If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 10 working-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Design Agent's additional services made necessary by such default, neglect, or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Design Agent. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR
§ 3.1 GENERAL
§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Design Agent, or by tests, inspections, or approvals required or performed by persons or entities other than the Contractor.

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Owner and the Design Agent any errors, inconsistencies, or omissions discovered by or made known to the Contractor or additional Drawings, Specifications, or instructions required to define the Work in greater detail to permit the proper progress of the Work as a request for information in such form as the Design Agent may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Design Agent and the Owner any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Design Agent or Owner may require.

§ 3.2.3.1 Omissions from the Drawings and Specifications of items obviously needed to perform the Work properly, such as attachments, bolts, hangers, and other fastening devices, shall not relieve the Contractor from the obligation to furnish and install such items.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Design Agent issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2, 3.2.3, or 3.2.3.1, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Design Agent for damages resulting from errors, inconsistencies, or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.4.1 The Contractor shall not make any changes without prior written authorization from the Design Agent and the Owner.

§ 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Design Agent and shall not proceed with that portion of the Work without further written instructions from the Design Agent. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely

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responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Whenever the Contractor has an obligation to provide labor and materials under the Agreement, the Contractor, at a minimum, shall provide the labor for, and furnish and install and place in operation all items, including without limitation, all proper connections.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Design Agent in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Design Agent and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and the Design Agent that materials and equipment furnished under the Contract will be of first quality, prime manufacture, and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements, including substitutions not properly authorized, may be considered defective and, unless a longer period is required elsewhere in the Contract Documents, will be repaired and/or replaced, at the option of the Owner, for a period of one year following Final Completion of the Work. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Design Agent, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

§ 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.2 The State of Rhode Island is exempt from payment of any federal or state excise, transportation, or sales tax. The Rhode Island Department of Administration Division of Purchases will furnish Exemption Certificates upon request.

§ 3.6.3 Pursuant to R.I. Gen. Laws § 44-1-6, the Owner shall withhold payment from the Contractor if the Contractor does not maintain a regular place of business in Rhode Island in the amount of three (3%) percent of the Contract Sum until 30 calendar days after Final Completion and compliance by the Contractor with the requirements of such section.

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§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections required by the Rhode Island State Building Code necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded. The Contractor shall be responsible for obtaining the Certificate of Occupancy from the appropriate governmental authorities.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 The Contractor shall promptly notify the Design Agent and the Owner if the Contractor becomes aware that the Contract Documents are not in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Design Agent before conditions are disturbed and in no event later than 21 working days after first observance of the conditions. The Design Agent will promptly investigate such conditions and, if the Design Agent determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Design Agent determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Design Agent shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Design Agent's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Design Agent. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Design Agent the name and qualifications of a proposed superintendent. The Design Agent may reply within 14 working days to the Contractor in writing stating (1) whether the Owner or the Design Agent has reasonable objection to the proposed superintendent or (2) that the Design Agent requires additional time to review. Failure of the Design Agent to reply within the 14 working-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, within 20 working days after the issuance of the Purchase Order, shall prepare and submit for the Owner's and Design Agent's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals, not less frequently than monthly, as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall certify on the initial schedule and all revised schedules that they comply with the Contract Documents.

§ 3.10.2 The Contractor shall prepare a submittal schedule, within 20 working days after the issuance of the Purchase Order, and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Owner's and the Design Agent's approval. The Owner's and the Design Agent's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Owner and the Design Agent reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Design Agent.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Design Agent and shall be delivered to the Design Agent for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design

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concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Design Agent is subject to the limitations of Section 4.2.7. Informational submittals upon which the Design Agent is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Design Agent without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Design Agent Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Owner and the Design Agent or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Design Agent that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Design Agent.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Design Agent's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Design Agent in writing of such deviation at the time of submittal and (1) the Design Agent has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Design Agent's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Design Agent on previous submittals. In the absence of such written notice, the Design Agent's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Design Agent will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Design Agent. The Owner and the Design Agent shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Design Agent have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Design Agent will review, approve, or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Design Agent for evaluation of resubmittals.

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§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, and any restrictions imposed by the User Agency or the Owner, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Design Agent access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Design Agent harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Design Agent. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Design Agent and the Owner.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, the State of Rhode Island, and each executive, legislative, judicial, regulatory, and administrative body of the state, and any political subdivision thereof, including without limitation, any department, division, agency, commission, board, office, bureau, committee, authority, educational institution, school, water, and fire district, and other agency of Rhode Island state, municipal, and local government that exercises governmental functions, any other governmental authority, and any quasi-public corporation and/or body corporate and politic, including without limitation, the User Agency, their elected and appointed officials, members, employees, and agents , the Design Agent, the Design Agent's Consultants, Subconsultants, and Subcontractors, and agents and employees and any of them from and against any and all claims, demands, damages, liabilities, judgments, losses and expenses, including but not limited to attorneys' fees and costs of mediation, arbitration, and/or litigation, arising out of or resulting from performance of the Work, and/or the obligations of the under the Contract Documents, but only to the extent caused by the acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not any such claim, demand, damage, liability, judgment, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.18.3 Without limiting the generality of the foregoing, the defense and indemnity set forth in this Section 3.18 includes, without limitation, all liabilities, damages, losses, claims, demands, and actions on account of bodily injury, death, or property loss to a person or entity indemnified hereunder or any other persons or entities, whether based upon statutory (including, without limitation, workers compensation), contractual, tort, or other liability of any person or entity so indemnified.

§ 3.18.4 The remedies set forth herein shall not deprive any person indemnified hereunder of any other indemnity action, right, or remedy otherwise available to any such person or entity at common law or otherwise.

§ 3.18.5 The Contractor will include the indemnity set forth in this Section 3.18, without modification, in each Subcontract with any Subcontractor.

§ 3.18.6 Notwithstanding any other language in the Contract Documents to the contrary, the indemnity hereunder shall survive Final Completion of the Work and final payment under the Agreement and shall survive any termination of the Agreement.

ARTICLE 4 DESIGN AGENT

§ 4.1 GENERAL

§ 4.1.1 The Design Agent is the person lawfully licensed to practice his or her profession in the State of Rhode Island or an entity lawfully practicing its profession in the State of Rhode Island and identified in the Contract Documents as the Design Agent. The term "Design Agent" means the Design Agent or the Design Agent's authorized representative.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Design Agent as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Design Agent. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Design Agent is terminated, the Owner shall employ a successor Design Agent as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Design Agent.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Owner with assistance from the Design Agent will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction through the date the Design Agent issues the final Certificate for Payment and continuing until the expiration of the warranty period in Section 3.5. The Design Agent will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Design Agent will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Design Agent will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Design Agent will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

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§ 4.2.3 On the basis of the site visits, the Design Agent will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Design Agent will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Design Agent will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION
Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Design Agent about matters arising out of or relating to the Contract. Communications by and with the Design Agent's consultants shall be through the Design Agent. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Design Agent's evaluations of the Contractor's Applications for Payment, the Design Agent will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Design Agent has authority to reject Work that does not conform to the Contract Documents. Whenever the Design Agent considers it necessary or advisable, the Design Agent will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Design Agent nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Design Agent to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Design Agent will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Design Agent's action will be taken in accordance with the submittal schedule approved by the Design Agent or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Design Agent's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Design Agent's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Design Agent's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Design Agent, of any construction means, methods, techniques, sequences or procedures. The Design Agent's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Design Agent will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Design Agent will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Design Agent will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Design Agent agree, the Design Agent will provide one or more project representatives to assist in carrying out the Design Agent's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Design Agent will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Design Agent's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

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§ 4.2.12 Interpretations and decisions of the Design Agent will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Design Agent will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Design Agent's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents and approved by the Owner.

§ 4.2.14 The Design Agent will review and respond to requests for information about the Contract Documents. The Design Agent's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Design Agent will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and the Design Agent the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Owner may reply within 14 working days to the Contractor in writing stating (1) whether the Owner or the Design Agent has reasonable objection to any such proposed person or entity or (2) that the Owner or Design Agent requires additional time for review.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Design Agent has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Design Agent has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Design Agent makes reasonable objection to such substitution.

§ 5.2.5 MANUFACTURERS AND FABRICATORS

§ 5.2.5.1 Not later than 10 working days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner and the Design Agent the names of the manufacturers or fabricators for certain products, equipment, and systems identified in the Specifications and, where applicable, the name of the installing Subcontractor. The Owner may reply within 14 working days to the Contractor in writing, stating: (i) whether the Owner or the Design Agent has reasonable objection to any such proposed person manufacturer or fabricator; or (ii) whether the Owner or Design Agent requires additional time to review.

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§ 5.2.5.2 The Contractor shall not contract with a proposed manufacturer, fabricator, or Subcontractor to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.5.3 If the Owner or Design Agent has an objection to a manufacturer, fabricator, or Subcontractor proposed by the Contractor, the Contractor shall propose another to whom the Owner or Design Agent has no objection.

§ 5.2.5.4 The Contractor shall not substitute a manufacturer, fabricator, or Subcontractor previously selected if the Owner or Design Agent makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Design Agent. Upon the request of the User Agency and/or the Owner, the Contractor shall provide the User Agency and/or the Owner with copies of each subcontract agreement. Each subcontract agreement shall preserve and protect the rights of the Owner and Design Agent under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- **.2** assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 working days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any

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revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Design Agent apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement between the Owner and the Contractor; a Construction Change Directive requires agreement by the Owner and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Design Agent alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Contractor and signed by the Owner, Contractor and Design Agent stating their agreement upon all of the following:

- **.1** The change in the Work;
- **.2** The amount of the adjustment, if any, in the Contract Sum; and
- **.3** The extent of the adjustment, if any, in the Contract Time.

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§ 7.2.2 Subsequent to the approval of a Change Order as provided in § 7.1.2, whether such Change Order changes the Contract Sum or Contract Time or both, no additional claim related to such Change Order will be considered by the Owner. Any change, once incorporated into a Change Order, is all inclusive, and includes all factors that could have been considered at the time of the Change Order such as Project impact or schedule "ripple" effect.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Design Agent and signed by the Owner, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.
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§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** As provided in Section 7.3.7.

§ 7.3.4 Deleted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Design Agent of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Design Agent shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.3.1. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Design Agent may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- **.1** Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- **.2** Costs of materials, supplies and equipment, including cost of delivery;
- **.3** Rental costs of machinery and equipment, exclusive of hand tools; or
- **.4** Costs of premiums for all bonds and insurance and permit fees related to the Work..

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Design Agent. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Design Agent will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Design Agent determines, in the Design Agent's professional judgment, to be reasonably justified. The Design Agent's interim determination of cost shall adjust the Contract

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Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Design Agent concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Contractor will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

.1 For the Contractor, for work performed by the Contractor's own forces, an amount not to exceed ten (10%) percent of the cost.

.2 For the Contractor, for work performed by the Contractor's Subcontractors, an amount not to exceed five (5%) of the amount due to the Subcontractors.

.3 For each Subcontractor, for work performed by the Subcontractor's own forces, an amount not to exceed ten (10%) percent of the cost.

.4 Where the Work represents both additions and deletions and results in a net increase, the allowable overhead and profit shall be in accordance with this Section 7.3.11, but in no event shall the amount exceed fifteen (15%) percent of the net increase in the cost of the Work.

§ 7.3.12 All proposals with an aggregate cost equal to or in excess of $500.00 shall be accompanied by a detailed itemization of costs, including labor, materials (quantities and prices), and Subcontracts, in a form acceptable to the Owner. In no event will a change order request reflecting an aggregate cost equal to or in excess of $500.00 be approved without such itemization.

§ 7.4 MINOR CHANGES IN THE WORK

The Design Agent with the prior written approval of the Owner has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be affected by written order signed by the Design Agent and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

The date of commencement of the Work is the date established in Section 3.1 of the Agreement..

§ 8.1.3 The date of Substantial Completion is the date certified by the Design Agent in accordance with Section 9.8.

§ 8.1.4 Deleted.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Design Agent, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other

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causes beyond the Contractor's control, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Within 20 working days of the issuance of the Purchase Order, and promptly if revision is necessary from time to time as a result of a Change Order, the Contractor shall submit to the Owner, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Design Agent and the Owner may require. This schedule, if and when approved by the Design Agent and the Owner in writing, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least 10 working days before the date established for each progress payment, the Contractor shall submit to the Design Agent and the Owner for approval an itemized Application for Payment prepared in accordance with the schedule of values for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or the Design Agent may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 All Applications for Payment for Change Orders must be accompanied by a Notice of Change in Purchase Order issued by the Owner, and if directed by the Owner, by the User Agency.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 The form of Application for Payment shall be AIA Document G702, Application and Certification for Payment, supported by AIA Document G702A, Continuation Sheet.

§ 9.3.1.4 Until final payment, the Owner shall pay ninety-five (95%) percent of the amount due the Contract on account of progress payments.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. The Contractor shall immediately satisfy any lien, claim, or encumbrance against the site where the Project is located and indemnify the Owner from and against all resulting costs and expenses, including without limitation, attorneys' fees.

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§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Design Agent will, within 7 working days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Design Agent determines is properly due, or notify the Contractor and Owner in writing of the Design Agent's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Design Agent to the Owner, based on the Design Agent's evaluation of the Work and the data comprising the Application for Payment, that, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Design Agent. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Design Agent has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.4.3 The Contractor must submit all product literature, material and color samples with each Application for Payment, or as otherwise required by the Owner.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Design Agent will withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Design Agent's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Design Agent is unable to certify payment in the amount of the Application, the Design Agent will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Design Agent cannot agree on a revised amount, the Design Agent will promptly issue a Certificate for Payment for the amount for which the Design Agent is able to make such representations to the Owner. The Design Agent may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Design Agent's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of:

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a separate contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- **.7** failure to carry out the Work in accordance with the Contract Documents; or
- **.8** any other failure to comply with the obligations of the Contractor under the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Design Agent withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Design Agent and the Design Agent will reflect such payment on the next Certificate for Payment.

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§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Design Agent has issued a Certificate for Payment and the Owner has approved the Certificate for Payment in writing, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Design Agent.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than 10 working days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Design Agent will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Design Agent and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within 7 working days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. The Owner shall have the right to withhold payment(s) to the Contractor in the event that any Subcontractors or material and equipment suppliers have not been properly paid. Neither the Owner nor Design Agent shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Design Agent does not issue a Certificate for Payment, through no fault of the Contractor, within 7 working days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within 7 working days after the date established in the Contract Documents the amount certified by the Design Agent or awarded by binding dispute resolution, then the Contractor may, upon 7 additional working days' written notice to the Owner and Design Agent, make a claim for payment as provided under the provisions of applicable law.
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§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Design Agent a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Design Agent will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Design Agent's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the

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Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Design Agent. In such case, the Contractor shall then submit a request for another inspection by the Design Agent to determine Substantial Completion. The Design Agent will perform no more than 2 inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for any additional inspections.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Design Agent will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment less the amount of five (5%) percent to be retained by the Owner until the first anniversary of Final Completion of the Work. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Design Agent as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Design Agent.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Design Agent shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Design Agent will promptly make such inspection and, when the Design Agent finds the Work acceptable under the Contract Documents and the Contract fully performed, the Design Agent will promptly issue a final Certificate for Payment stating that to the best of the Design Agent's knowledge, information and belief, and on the basis of the Design Agent's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Design Agent's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. The Design Agent will perform no more than 2 inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for any additional inspections.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Design Agent (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be

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canceled or allowed to expire until at least 30 working days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, and (6) all other close-out documents required by the Owner, including without limitation, all as-built plans, warranties, manuals, and other materials set forth in the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Design Agent so confirms, the Owner shall, upon application by the Contractor and certification by the Design Agent, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Design Agent prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** claims permitted under the State of Rhode Island General Conditions of Purchase Regulation.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11 The Contractor and the Contractor's surety shall be liable for and shall pay the Owner as liquidated damages the sums specified in the Solicitation and Bid Form, or if completed, the amount set forth in Section 3.4 of the Agreement.

§ 9.12 Warranties required by the Contract Documents shall commence on the date of Final Completion of the Work.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

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§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel and in consultation with the appropriate governmental authorities.

§ 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the User Agency and the Owner reasonable advance notice.

§ 10.2.4.2 If the Contract Documents require the Contractor to handle materials or substances that under certain circumstances may be designated as hazardous, the Contractor shall handle such materials in an appropriate manner.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Design Agent or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Design Agent.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Design Agent in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Design Agent the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Design Agent will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Design Agent has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Design Agent have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the

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Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the extent permitted by the provisions of R.I. Gen. Laws §§ 9-31-1 et seq., the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Design Agent, Design Agent's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as is specified in the Solicitation and as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.1.2 The Contractor's liability insurance shall include all major coverages and be on a comprehensive general liability basis.

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§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance as specified in the Solicitation and as otherwise acceptable to the Owner shall be filed with the Owner and the User Agency prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 working days' prior written notice has been given to the Owner and the User Agency. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the User Agency, and their elected and appointed officials, members, employees, and agents, the Design Agent and the Design Agent's consultants as additional insureds for claims caused in whole or in part by the Contractor's acts or omissions during the Contractor's operations; and (2) the Owner, the User Agency, and their elected and appointed officials, members, employees, and agents, as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.1.5 The Contractor shall be responsible for the prompt payment to the Owner of any deductible amounts under any insurance policies required under the Contract Documents for claims made pursuant to such policies.

§ 11.2 OWNER'S LIABILITY INSURANCE.

§ 11.2.1 The Contractor shall furnish the Owner and the User Agency, through the Design Agent, an insurance certificate providing Owner's Protective Liability extended to include the interests of the Design Agent, and to protect the Owner, User Agency, and Design Agent from any liability which might be incurred against any of them as a result of any operation of the Contractor or Subcontractors or their employees or anyone for whom either the Contractor or Subcontractors are responsible. Such insurance shall be written for the same limits as the Contractor's comprehensive general liability insurance and shall include the same coverage.

§ 11.2.2 If the Owner engages separate contractors to perform work for, or in or around, the Project, it shall require in its contracts with each separate contractor that Contractor and its officers, directors, partners, members, employees, and agents shall be: (i) named as additional insureds on a primary, noncontributory basis to any commercial general liability, pollution liability, and excess liability insurance policies; and (ii) provided a waiver of subrogation on all workers compensation and professional liability insurance policies.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the state of Rhode Island, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the User Agency, the Contractor, Subcontractors and Sub-subcontractors in the Project. If the Owner and/or the User Agency incur any damages by failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable cost resulting from such failure.

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§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Design Agent's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 Deleted.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Deleted.

§ 11.3.3 Deleted.

§ 11.3.4 Deleted.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 working days' prior written notice has been given to the Owner and the User Agency.

§ 11.3.7 WAIVERS OF SUBROGATION

The Contractor waives all rights against the Owner and the User Agency and any of their subcontractors, sub-subcontractors, agents and employees, and (2) the Design Agent, Design Agent's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Design Agent, Design Agent's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under this property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of

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insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within 5 working days after occurrence of loss to the Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Solicitation.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Design Agent's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Design Agent, be uncovered for the Design Agent's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Design Agent has not specifically requested to examine prior to its being covered, the Design Agent may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Design Agent or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Design Agent's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Final Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time after receipt of notice from the Owner or Design Agent, the Owner may correct it in accordance with Section 2.4.

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§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.2.4 Upon request by the Owner and prior to the expiration of one year from the date of Final Completion, the Design Agent will conduct and the Contractor shall attend 2 meetings with the Owner to review the facility operations and performance.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the State of Rhode Island.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to any executive, legislative, judicial, regulatory, or administrative body of the state, or any political subdivision thereof, including without limitation, any department, division, agency, commission, board, office, bureau, authority, school, water, or fire district, or other agency of Rhode Island state or local government that exercises governmental functions, any other governmental authority, and any quasi-public corporation and/or body corporate and politic. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice, or when received, if manually delivered or transmitted by electronic mail or facsimile to the last such address known to the party giving notice.

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§ 13.4 RIGHTS AND REMEDIES

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

§ 13.4.2 No action or failure to act by the Owner, Design Agent or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Design Agent timely notice of when and where tests and inspections are to be made so that the Design Agent may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Design Agent, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Design Agent will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Design Agent of when and where tests and inspections are to be made so that the Design Agent may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Design Agent's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Design Agent.

§ 13.5.5 If the Design Agent is to observe tests, inspections or approvals required by the Contract Documents, the Design Agent will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

No interest shall be due or payable on account of any payment due or unpaid under the Contract Documents except in accordance with the provisions of "Prompt Payment by Department of Administration," R.I. Gen. Laws §§ 42-11.1-1 et seq.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 calendar days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other

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persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped; or

.3 Because the Design Agent has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1

§ 14.1.2 Deleted.

§ 14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon 7 working days' written notice to the Owner and Design Agent, terminate the Contract and recover from the Owner payment for Work executed.

§ 14.1.4 If the Work is stopped for a period of 60 calendar days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon 7 additional days' written notice to the Owner and the Design Agent, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

.1 refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 disregards or fails to comply with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;

.4 otherwise is guilty of breach of a provision of the Contract Documents; or

.5 cancels or the Contractor or the Owner receives notice of cancellation or nonrenewal of any insurance required under the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, 7 working days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Design Agent's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

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§ 14.3.2 The Owner shall not be liable to the Contractor or any Subcontractor for claims or damages of any nature caused by or arising out of any delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work in accordance with the provisions of Section 8.3.1.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- **.3** except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party. Such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly serviced if delivered in person, by mail, by courier, or by electronic transmission. Claims by either party must be initiated within 21 working days after occurrence of the event giving rise to such Claim or within 21 working days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Design Agent will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.5.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time

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claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.5.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.6 Deleted.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims shall be referred to the Initial Decision Maker for initial decision. The Purchasing Agent appointed pursuant to the provisions of the "State Purchases Act," R.I. Gen. Laws § 37-2-1 et seq., will serve as the Initial Decision Maker in accordance with the provisions of the State Purchases Act, State of Rhode Island Procurement Regulations, and this Section 15.2.1. An initial decision shall be required as a condition precedent to binding dispute resolution pursuant to Section 15.3.1 of any Claim arising prior to the date final payment is due.

§ 15.2.2 Deleted.

§ 15.2.3 Deleted.

§ 15.2.4 Deleted.

§ 15.2.5 Deleted.

§ 15.2.6 Deleted.

§ 15.2.6.1 Deleted.

§ 15.2.7 Deleted.

§ 15.2.8 Deleted.

§ 15.3 MEDIATION

§ 15.3.1 For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 15.2.1, and prior to the implementation of the binding dispute resolution procedures set forth in Section 15.4.1, the Contractor or the Architect shall have the option to pursue mediation, exercisable by written notice to the Owner within 30 calendar days of an Initial Decision. In the event of the exercise of such option by the Contractor or the Architect, the Owner and the Contractor or the Architect shall attempt to select a mediator, and in the event that the Owner and the Contractor or the Architect cannot agree on a mediator, either party may apply in writing to the Presiding Justice of the Providence County Superior Court, with a copy to the other, with a request for the court to appoint a mediator, and the costs of the mediator shall be borne equally by both parties.

§ 15.3.2 Deleted.

§ 15.3.3 Deleted.

§ 15.4 BINDING DISPUTE RESOLUTION

§ 15.4.1 For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 15.2.1, or mediation at the option of the Contractor pursuant to Section 15.3.1, the method of binding dispute resolution shall be determined in accordance with the provisions of the "Public Works Arbitration Act," R.I. Gen. Laws §§ 37-16-1 et seq.

§ 15.4.4 Deleted.

§ 15.4.4.1 Deleted.

§ 15.4.4.2 Deleted.

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§ 15.4.4.3 Deleted.

§ 16 COMPLIANCE WITH APPLICABLE LAW

The Contractor and its Subcontractors shall comply with all applicable federal, state, and local laws.

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SECTION 00 8000

SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

The following supplements further modify the Modified AIA Document A201, General Conditions of the Contract for Construction, 2007 Edition. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

PART 2 - ARTICLES

ARTICLE 13…MISCELLANEOUS PROVISIONS

Add the following Paragraph 13.10 to Article 13

13.10 Equal Opportunity

13.10.1 The Contractor shall maintain policies of employment as follows:

13.10.1.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, sexual preference or national origins. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, sexual preference, or national origin.

Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of nondiscrimination.

13.10.1.2 The Contractor and the Contractor's Subcontractors shall in all solicitations or advertisements for employees placed by them or on their behalf; state that all qualified applicants will receive considerations for employment without regard to race, religion, color, sex, sexual, or national origin.

13.10.1.3 The Contractor shall be a signatory to the requirements of the Rhode Island Equal Employment Office.

Add the following Paragraph 13.11 to Article 13:

13.11 Prevailing Wage Scales on Public Works Projects

13.11.1 Prevailing Wages shall be paid in accordance with Chapter 37-13 et seq. of the General Laws of Rhode Island, as amended and in accordance with the Rules and Regulations of the Department of Labor. Violators are subject to and responsible for all penalties, fines, and adjustments in wage and benefit payments as prescribed in Chapter 37-13 of the Rhode Island General Laws entitled "Labor and

Payment of Debts by Contractors." This law shall be considered incorporated herein as if attached and written in full. Specific attention is called to Chapter 37-13-8 regarding the requirement that that "*each contractor awarded a public works contract after July 1, 2007 shall contact the department of labor and training on or before July first of each year, for the duration of such contract to ascertain the prevailing wage rate of wages on a hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done each year and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee every July first.*"

13.11.2 The wage rates as ascertained by the Department of Labor shall apply. Information concerning wage rates prevailing in the construction industry in Rhode Island may be obtained from the Office of the State Department of Labor, 1511 Pontiac Avenue, Cranston, Rhode Island and are also available by accessing the following web site, http://www.purchasing.ri.gov. Under no condition shall the wages paid, be less than those designated in the general classification and the base bids shall be prepared taking into consideration the requirement for the annual adjustments.

13.11.3 The Contractor shall meet all the requirements prescribed by the State Labor Laws and regulation, issued by the Rhode Island Department of Labor, pertaining to Public Works Projects General Laws of Rhode Island. The laws are hereby made part of this Project as if attached and written in full. These laws include, but are not limited to:

1. Weekly payment of employees;
2. Provisions applicable to Public Works Contracts;
3. Payment of Prevailing Wages;
4. Posting of Prevailing Wage Rates and;
5. Overtime Compensation

It is the contractor's responsibility to use the current prevailing wage table. The table may be obtained at the RI Division of Purchases Home Page at www.purchasing.ri.gov .

Add the following Paragraphs to Article 13

13.12 SHUTDOWNS

While every effort should be made to minimize disruptions to communications, data, mechanical and/or electrical shutdowns affecting the existing operations and facilities at the Work Site and on campus with the work, the following criteria has been established in the event shutdowns are required to carry out the work scope of the project and/or in the event of emergency conditions.

The Contractor shall make provisions to assure that closure and/or disruption to roadways, driveways, sidewalks and other site access is minimized and scheduled well in advance if partial closure is required. Partial closure will be requested in writing by the Contractor and approved in writing by the Owner. At no time shall site access be permitted to be fully closed. The Contractor shall assure that traffic flow is maximized during peak hours of operation at the facility and at roadways affecting not only access to the site but the community as well. When traffic on these roadways is disrupted, the Contractor shall provide Police protection to assure public safety and movement of traffic as part of the base bid costs.

Additionally, these conditions shall be used regarding Public Ways such as streets and sidewalks and adjacent businesses as they may be affected by the project. It is the Contractors responsibility to provide and pay for all permits, temporary facilities, police protection, and details required to carry out the project scope. A detailed accounting and plan of the work to be performed during the shutdown shall be provided that includes the reason and duration of the shutdown, and any operations that will be affected by the shutdown.Plans shall be prepared by the Contractor and submitted to the Architect and Owner for review and then submitted to the appropriate authorities such as but not limited to State and Local Police, State and Local Public Works, Local Fire Departments and other agencies having jurisdiction.

Furthermore, the Contractor shall work with the Owner in maintaining the integrity of all systems at the Work Site. The Contractor must coordinate and minimize any and all shutdowns of building systems as follows:

1. Assure that the Owner is provided with proper notice when making shutdowns and pay any fees as may be required and make any accommodations necessary to maintain operations and employee and resident comfort.
2. Ensure that the building operations can continue in a secure manner and employee and resident comfort is maintained throughout the day, seven days a week.

The Contractor shall clearly define through the submittal process (before an exposure to disruptions in services can be triggered) complete and comprehensive protocols and procedures which will establish the notification procedure and specific details for permanent and/or temporary conditions to be implemented by the Contractor and accommodations for building operations and employee comfort. The submittals shall be provided to the Owner and Architect for the Owner's approval and at a minimum defines a procedure for the following:

01- Pre-notification Scheduled shutdowns (a minimum of not less than seven (7) calendar days notification for disruptions and shut downs to issues such as but not limited to the following:

Power
Data
Communications
Mechanical Systems
Fire Protection
Emergency Egress as may be required
Water
Roadways
Driveways
Parking
Employee and Public Entrances and Egress
Building Spaces
Handicap parking and handicap building access

All costs associated with these activities and accommodations for maintaining building operations and employee comfort are considered part of the Base Bid and Base Project Schedule.
The protocol submitted to the Owner and Architect shall establish the Contractor's written notification procedure and the Contractor's plans on making either permanent work around solutions and/or temporary solutions to assure that the facility and/or facilities continue with productive and safe business operations as usual, unless otherwise approved in writing by the Owner.

02- It is understood that certain circumstances and conditions sometimes require disruptions and shut downs that were planned for but however, may not have had the precise timing pre-planned, schedule acceleration has impacted the timing, extraordinary circumstances dictate that the work be performed out of sequence to allow the Project to continue. These disruptions/ shut downs shall be permitted with proper notification and in accordance with the protocols established by the Contractor as approved by the Owner provided notification is provided within seven (7) days of the scheduled work and,as long as accommodations are provided for continued building operations and maintaining employee comfort. All costs associated with these activities are considered part of the Base Bid and Base Project Schedule.

Illustrative examples include but are not limited to:

Power
Data
Communications
Mechanical Systems
Fire Protection
Emergency Egress as may be required
Water
Roadways
Driveways
Parking
Employee and Public Entrances and Egress
Building Spaces
Handicap parking and handicap building access

The Owner reserves the right to reject and/or request modification to these disruptions/ shut down requests, if it is determined that the request cannot be carried out in a manner that protects the interest of the Owner. In the event the request is rejected and/or otherwise modified the Contractor shall not be compensated for additional costs and/ or provided additional time for the Project provided the modification and timing is for just cause.

003- A protocol for Emergency and/or Accidental Shutdowns that require an Immediate Response Action shall be established for the Project.

The Contractor shall clearly provide details as to how they intent to minimize and/or otherwise correct or make alternate provisions to minimize the impact of the disruption to the Owner for issues pertaining to items such as but not limited to…

Power
Data
Communications
Mechanical Systems
Fire Protection
Emergency Egress as may be required
Water
Roadways
Driveways

Parking
Employee and Public Entrances and Egress
Building Spaces
Handicap parking and handicap building access

The costs for Emergency and/or Accidental disruptions and/or shut downs shall be borne by the Contractor.

004- The Contractor acknowledges that any and, all cost borne by the Owner and Architect due to shutdowns of systems due to poor planning by the Contractor shall be paid for by the Contractor and shall be appropriately deducted by a deductive change order affecting the next payment requisition.

Additionally, the Contractor shall not be eligible for time extensions due to rejection of a shutdown, rejected for failure to comply with this section or due to poor planning by the Contractor.

005- Not used.

006- Perform any duties required by Owner when making a shut down.

007- Provide appropriate fire watch during shutdowns which may affect fire alarm and or sprinklers system operations.

008- Duration of shutdowns shall be kept to a minimum.

009- All systems shall be returned to normal operating conditions at end of work day, unless otherwise planned and provided for and approved by the Owner in writing.

13.13ZERO PUNCH LIST ITEM OBJECTIVES

The Contractor shall promptly correct conditions pointed out as being deficient at the time of the discovery and notification of such conditions and shall not defer the correction of work to the punch list or close-out phases of the project. Upon notification of deficient work the Contractor shall take action to correct the existing Work and not continue with new/additional Work in the manner that has been identified as being deficient. Deviation from this project approach shall be grounds for a Stop Work Order on the Project and the Owner and Architect will not be responsible for delays and/or additional costs due to the Stop Work Order.

All punch list and deficient work shall be performed by workmen skilled in the trade of the item damaged or improperly installed and in no cases shall repair work be performed by anyone other than the original installing Contractor without the written approval of the Owner and/or Architect, unless said Contractor is determined incompetent to continue such work at which time the Contractor will submit an alternative Contractor to the Owner in writing for approval at no additional costs to the Owner.

13.14 ADDITIONAL CONTRACT DOCUMENTS

Additional Consultant Reports included are to be considered part of the Contract Documents as Reference Materials. Consultant reports are complementary. They are as follows:

- None other than those included in the Drawings and Project Manual.

13.15Quantity of Drawings and Specifications due the Contractor

The Owner shall furnish to the Contractor one (1) electronic file which includes drawings in CAD format for the purposes of producing As Built Documents.

13.16Energy Rebates

When dealing with the utilities and other vendors in which the Owner is eligible for Energy Rebates or other forms of rebates, credits, discounts and etc., the Contractor shall assure that all applications are filled out and executed in a manner that rebate checks, credits and or/other forms of reimbursement are paid directly to the Owner with no exception unless otherwise noted and/or approved in writing.

13.17 Liquidated Damages

Damages are defined and delineated in the Bid Form

Add the following Paragraph 13.18 to Article 13

13.18 Special Warranties, Warranty Response Time, Service Contracts

The Contractor shall provide and pay for all the requirements outlined in this section (13.18) as part of the Project Base Bid.

Service Contracts will be captured in the Project Schedule of Values. The costs associated with the Service Contract Work will not be subject to retainage and will be billed quarterly for the duration of the Service Contract period, unless otherwise approved in writing by the Owner.

Warranty Provisions:

As prescribed in Paragraph 12.2.2.1 of AIA Document A201- 2017 as amended by the Contract Agreement the Contractor shall provide a minimum of a **two (2) year** warranty period on all systems, repairs, materials and workmanship incorporated in the project. Systems, repairs, materials and workmanship that has been prescribed as having warranties for periods greater than **two (2) years** by the individual specification sections shall be carried at the warranty period prescribed by that individual reference provided a minimum of **two (2) years** are provided in all aspects of the warranty/guarantee provisions.

Additionally, as prescribed in 12.2.2.2 of AIA Document A201-2017 as amended by the Contract Agreement, the **two (2) year** period for correction of work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of Work[1].

Furthermore, as provided in 12.2.2.3 of AIA Document A201-2017 as amended by the Contract Agreement states upon completion of any Work under or pursuant to Paragraph 12.2 that **the two (2) year**

[1] Punch List Completion and Acceptance

correction period in connection with the Work requiring correction shall be renewed and recommence. The obligations under Paragraph 12.2 shall cover any repairs and replacement to any part of the Work or other property that is damaged by the defective Work and Work impacted by such corrective action.

The Contractor is hereby notified that no warranty period of less than **two (2) years** is acceptable on the project and any and all contradictions to this **two (2) year** period in the individual specification sections shall be considered edited to read **two (2) years** in the event those specification sections indicate otherwise with the exception of those items that provide warranty/guarantee periods that are prescribed for a period of greater than **two (2) years**. Those periods shall remain for the period that has been prescribed, as greater than **two (2) years** as published and established in the Contract Documents.

Response Time Pertaining to Warranty Work:

The Contractor shall be prepared to respond to various warranty claims in accordance with the following schedule.

Schedule One, One Hour Response*:

The Contractor will respond to the Owner's request for service and have **qualified personnel on site** for:

- Significant[2] wall, and other building envelope system leaks (weather or non-weather related),
- Blockage of drainage systems
- Water infiltration resulting in total or partial failure of heating, cooling, and/or ventilation systems,
- Water infiltration resulting in total or partial loss of electrical power not related to service provider,
- Water infiltration resulting in partial or total loss of security systems, including but not limited to video surveillance, scanners, locking and arming of security systems and building locking,
- Water infiltration resulting in partial or total loss of data and telecommunications not related to service provider,
- Or, water infiltration resulting in any other failure of systems that could potentially cause significant damage to property and/or person.

Within One (1) Hour [twenty four hours a day seven days a week three hundred sixty five days or three hundred sixty six days a year, (24x7x365, 366)] of initial attempt to notify the Contractor, or applicable assigned/approved Subcontractor or Designee of the Contractor of the emergency condition.

Failure to respond within this prescribed period allows the Owner to obtain services by others to stabilize and/or correct the failed system to protect the building, equipment, and/or occupants. Should correction by others be necessary due to the failure of the Contractor to respond in accordance with the time prescribed herein, the Owner reserves the right to charge the Contractor for all services rendered to correct the condition including but not limited to direct fees, administrative fees and Work associated with cleanup and disposal of damaged materials. Work performed by others does not cancel or render applicable existing and/or extended warranties by the Contractor null and void as this

[2]"Significant" is defined as "Causing or Creating Damage and/or Danger to any of the Building Systems, Finishes, and/or Occupants."

work has been performed by others as the Contractor failed to respond to the warranty claim in accordance with the appropriate times prescribed herein.

Telephonic Communication will be the prime means of notification followed by written communication.

The "Initial Attempt to Notify the Contractor" for a response action to Warranty Claims shall be defined as the initial call placed to the Contractors Legal Place of Business, messages left with answering services, answering machines, electronic voice mail systems, messages with staff answering call at the place of business, messages with secretaries, calls placed to pagers, mobile phones and etc. E-Mails shall not be considered appropriate notification.

Schedule Two, Four Hour Response:

The Contractor will respond to and have **qualified personnel on site** for:

- Minor, roof, wall, window and other envelope areas of the Work or caused by the Work (weather or non-weather related),
- Minor blockage of drainage systems and mechanical system leaks in the Work or caused by the Work.

Within Four (4) Hours [twentyfour hours a day seven days a week three hundred sixty five days or three hundred sixty six days a year, (24x7x365, 366)] of initial attempt to notify the Contractor, or applicable assigned/approved Subcontractor or Designee of the Contractor of the emergency condition.

Failure to respond within this prescribed period allows the Owner to obtain services by others to stabilize and/or correct the failed system to protect the building, equipment, and/or occupants. Should correction by others be necessary due to the failure of the Contractor to respond in accordance with the time prescribed herein, the Owner reserves the right to charge the Contractor for all services rendered to correct the condition including but not limited to direct fees, administrative fees and Work associated with cleanup and disposal of damaged materials. Work performed by others does not cancel or render applicable existing and/or extended warranties by the Contractor null and void as this work has been performed by others as the Contractor failed to respond to the warranty claim in accordance with the appropriate times prescribed herein.

Telephonic Communication will be the prime means of notification followed by written communication.

The "Initial Attempt to Notify the Contractor" for a response action to Warranty Claims shall be defined as the initial call placed to the Contractors Legal Place of Business, messages left with answering services, answering machines, electronic voice mail systems, messages with staff answering call at the place of business, messages with secretaries, calls placed to pagers, mobile phones and etc. E-Mails shall not be considered appropriate notification.

Schedule Three, Twenty Four Hour Response:

The Contractor will respond to and have **qualified personnel on site** for:

ALL OTHER EMERGENCY TYPE CLAIMS that present safety issues, discomfort, and/or otherwise affects the well-being of the building occupants within Twenty Four (24) hours [twenty four hours a day seven days a week three hundred sixty five days or three hundred sixty six days a year, (24x7x365,366)] of initial attempt to notify the Contractor of the building condition.

Failure to respond within this prescribed period allows the Owner to obtain services by others to stabilize and/or correct the failed system to protect the building, equipment, and/or occupants. Should correction by others be necessary due to the failure of the Contractor to respond in accordance with the time prescribed herein, the Owner reserves the right to charge the Contractor for all services rendered to correct the condition including but not limited to direct fees, administrative fees and Work associated with cleanup and disposal of damaged materials. Work performed by others does not cancel or render applicable existing and/or extended warranties by the Contractor null and void as this work has been performed by others as the Contractor failed to respond to the warranty claim in accordance with the appropriate times prescribed herein.

Telephonic Communication will be the prime means of notification followed by written communication.

The "Initial Attempt to Notify the Contractor" for a response action to Warranty Claims shall be defined as the initial call placed to the Contractors Legal Place of Business, messages left with answering services, answering machines, electronic voice mail systems, messages with staff answering call at the place of business, messages with secretaries, calls placed to pagers, mobile phones and etc. E-Mails shall not be considered appropriate notification.

Schedule Four, Ten Day Response:

The Contractor will respond to and have **qualified personnel on site** for:

GENERAL WARRANTY CLAIMS within Ten calendar (10) days of the initial attempt to notify the Contractor of the need for action.

Failure to respond within this prescribed period allows the Owner to obtain services by others to stabilize and/or correct the failed system to protect the building, equipment, and/or occupants. Should correction by others be necessary due to the failure of the Contractor to respond in accordance with the time prescribed herein, the Owner reserves the right to charge the Contractor for all services rendered to correct the condition including but not limited to direct fees, administrative fees and Work associated with cleanup and disposal of damaged materials. Work performed by others does not cancel or render applicable existing and/or extended warranties by the Contractor null and void as this work has been performed by others as the Contractor failed to respond to the warranty claim in accordance with the appropriate times prescribed herein.

Telephonic Communication will be the prime means of notification followed by written communication.

The "Initial Attempt to Notify the Contractor" for a response action to Warranty Claims shall be defined as the initial call placed to the Contractors Legal Place of Business, messages left with answering services, answering machines, electronic voice mail systems, messages with staff

answering call at the place of business, messages with secretaries, calls placed to pagers, mobile phones and etc. E-Mails shall not be considered appropriate notification.

Service and Mandatory Contract Requirements:

The Work shall be carried out by the Contractor or Sub-Contractors that provided and installed the original systems, assemblies, components, and etc. unless otherwise approved in writing by the Owner and Architect, or the regulatory requirements mandate another source of service. In such instances **where the service company has to be other than the original installing Contractor**, the firm proposed by the Contractor shall be submitted to the Owner for approval. The Owner reserves the right to reject a proposed Service Provider if it is determined to be in the best interest of the Owner to do so, and a new provider shall be submitted to the Owner for consideration at no additional cost to the Owner. All service companies shall be licensed to perform services in the State of Rhode Island and be in good standing with any and all regulatory agency(s) governing their licenses and/or trade.

The relation of Service Provider shall be established by a service contract established by the Service Provider between the Contractor, the Service Provider, and the building end user (appropriate name and contacts will be provided to the Contractor) as applicable which clearly outlines services to be provided. Payments for services shall be made to the Service Provider by the Contractor.

The Service Provider shall make all arrangements for the scheduling and timing of any and all preventative, predictive, and scheduled maintenance service calls, testing, seasonal system closure and startup and other requirements through the Facilities Management responsible for oversight (manager contact information will be submitted to the Contractor) and/or persons designated by the Owner. It shall be the responsibility of the Contractor through its Service Provider to assure that timely and on schedule maintenance takes place in accordance with all system requirements.

The following systems, as applicable to this project, shall be fully covered by programs that allow for legally prescribed testing, services, adjustments and etc. required to continue operations of the building system, in full compliance with any and all local, state, federal and miscellaneous requirements for continuous and uninterrupted building operations.

PREVENTATIVE, PREDICTIVE, SCHEDULED and REGULATORY
The following categories will require Service Contracts for those items provided per contract
None

13.19Technical Expertise and Quality Expectations

The Contractor is herein advised that it is the Owner's intent to assure that all persons working on the project provide workmanship to the highest degree of all standards applicable in the industries in which they practice.

As such the Contractor is hereby notified that the selection of their project management teams, sub-contractors and their project management teams are fully compatible, properly trained and licensed and have a track-record in performing work in strict accordance with the required degree of quality to assure a fully functional facility on opening day. It shall be noted that access to the building is limited and systems are critical and opportunity to perform corrective work is extremely limited and disruptive to the facilities operation.

13.20 INDOOR AIR QUALITY PROGRAM

It is the Owners goal on this project to be proactive in maintaining the environmental comfort of the facility for the workers, visitors, staff, and future occupants.

As it is a known fact, many short and long-term Indoor Air Quality (IAQ) issues with occupied buildings during construction work are a result of poor construction practices, the Contractor shall submit to the Owner and Architect an IAQ Management Plan prior to the start of construction. This plan shall address procedures and programs to be carried out during **ALL phases** of construction beginning on day one and continued through the punch list and final-completion phases of Work including initial occupancy as required and anticipated in the Construction Milestone Schedule. All costs associated with the development of the IAQ Management Plan, implementing the plan, performing, and supervising the work necessary to meet the objective of the IAQ Management Plan, and services required to enforce and monitor the program shall be part of the Base Bid provided by the Contractor.

The following areas and procedures have been identified and shall be incorporated in the plan, in addition to those items that have been identified in throughout the technical sections of the agreement and those areas otherwise customarily established in an IAQ Management Plan for new, existing, and occupied construction through organizations such as but not limited to the Sheet Metal And Air Conditioning Contractors National Association (SMACNA), and the United States Environmental Protection Agency (EPA).

General Concerns during Construction and Post Partial Occupancy are illustrated below and shall be addressed as part of the Indoor Air Quality Program:

- Maintain overall cleanliness of the job site and frequent housekeeping in all areas to eliminate dust and other debris during the Work.

- Assure that all products (i.e. flashing, masonry, drywall, insulation, and etc.) are not installed prior to proper weather protection and are fully protected from any sources of moisture throughout the entire construction process including receipt of the product.

- Promptly and thoroughly clean spills of materials that can be absorbed into the building substrate. Document areas, of such spills in the record drawings.

- Accelerate emissions of wet products by using high ventilation.
- Do not unnecessarily cut materials that create dust and other fine debris once the finish process has commenced in a specific area.
- Use dust recovery systems to minimize dust.
- No smoking shall be permitted on the project site.
- Properly dispose of food throughout the construction process at all times. Do not allow food or beverages to accumulate at any time and under no circumstances shall food and drink be permitted to be disposed of on the roof, in walls and other building cavities.
- Protect ducts from construction dust and debris. Keep ducts clean at all times.
- Establish a complete physical enclosure to any construction zone and or/ activity to protect any finished work when addressing punch lists and/or other corrective work.
- Seal all return ducts to ensure that contaminants do not enter the HVAC system.
- Insure that exhausted contaminants do not re-enter the building through open windows or the air intake of the HVAC system.

13.21 Noise Control

- The Contractor shall provide methods, means, and facilities to minimize noise produced by the Construction operations.
- The Contractor is permitted to work on sitefrom Monday through Friday 7 a.m. until 7 p.m.unless local ordinances or other regulations otherwise prohibit work during these hours. It is the Contractor's responsibility to ensure that it is working with in the hours permitted by the local and state laws and regulations. The Contractor is fully responsible for obtaining and paying all permit fees to work on weekends and holidays as may be required by local or state authorities and the payment of any fees associated with work outside the ordinances for weekday work.
- Work shall be permitted on Saturdays between the hours of 7 a.m. to 5 p.m. and Sundays between the hours of 8 a.m. and 5 p.m., unless local ordinances or other regulations otherwise prohibit work during these hours. It is the Contractor's responsibility to ensure that it is working within the hours permitted by the local and state laws and regulations. The Contractor is fully responsible for obtaining and paying all permits fees to work on weekends and holidays as may be required by local or state authorities and any fees associated with work outside the ordinances for weekday work.
- All requests to Work outside the delineated hours shall be submitted to the Architect in writing a minimum of one (1) calendar week (168 hours) in advance. The Architect and Owner reserves the right to reject such requests and rejection of request does not entitle the Contractor to an extension of Contract time and/or additional funds, unless those dates were clearly scheduled in the original Project Schedule.

Work required and/or directed outside the hours and conditions prescribed above to meet the scheduled project deadlines are subject to all the conditions prescribed within this section.

13.22 Dust Control

- The Contractor shall execute the Work by methods to minimize raising dust from construction operations on a continuous basis and provide effective dust control on a continuous and as needed basis as Work progresses. This is a critical requirement and shall be appropriately budgeted for as enforcement of this requirement is essential.

- The Contractor shall provide positive means to prevent significant amounts of air-borne dust from dispersing into the atmosphere.

- The Contractor shall fully comply with all applicable sections of the latest version of the Clean Air Act as enforced by the Environmental Protection Agency, The Rhode Island Department of Environmental Management, the Rhode Island Department of Health, OSHA, and any other agencies involved in its enforcement. Additionally, the Contractor shall fully comply with rules, regulations, laws, and standards governed at the state and local level that are related to the Clean Air Act and/or are otherwise extensions of the enforcement of the Clean Air Act. These acts are to be considered part of this Contract as if written in full and attached herein. The Contractor is responsible for and shall plan accordingly for all costs associated with the enforcement of these requirements.

13.23Pest Control

The Contractor shall provide methods, means, and facilities to prevent pests and insects from entering the facilities, project trailers, storage facilities and/or any other temporary amenities due to the contractor's Work and operations on campus. The contractor shall also prevent pests and insects from becoming a nuisance to neighboring properties. This is a critical objective; As such the Contractor shall provide a narrative as to the procedures that will be implemented to meet this objective. This narrative can be addressed in the Indoor Air Quality Program.

13.24 Notice of Technology Use for Documents

Contractors are here-in notified that the Project Team utilizes E-Mail, and Software to process RFI's, Payment Requisitions, Submittals and other critical project documents. As such the Contractor shall be prepared to utilize these methods of posting various documents through E-Mail and utilizing software such as but not limited to Microsoft Office, Adobe Acrobat, and AutoDesk AutoCAD.

13.26 Not used

13.27 Testing

INSTRUCTIONS FOR TECHNICAL INSPECTIONS:

The Owner shall direct the Contractor as to the firm or firms to be used for testing in each of the categories identified in the schedule below. The Owner shall pay for these testing services. Scheduling and other arrangements for testing shall be arranged through the Contractor with the Written Approval of the Owners on Site Representative and/or Architect and costs for coordination and administration of testing shall be part of the Contractors Base Bid.

Costs associated with testing for areas of construction, overall monitoring and/or system installations that are **NOT** identified in the following schedule that require testing, certification and/or other forms of quality control including testing prescribed as part of product application procedures and confirmation, specialized systems testing, and additional quality control related to paint; grout; air quality testing; water quality testing, noise/acoustics; shall be carried as part of the Base Bid Cost by the Contractor as a Contractor Cost, **regardless of the specifications direction to carry the cost otherwise**.

The following Testing Services will be paid for by the Owner as delineated in the schedule that follows the exceptions noted below:

- Retesting being performed as a result of the Contractors failure to properly perform or execute the original work.
- Retesting required due to failure of original test.
- Required retesting to reconfirm or otherwise determine course of action required for remediation of a system or assembly not meeting the specifications or other prescribed and/or required standard (s).
- Testing associated with the progress of rework as may be required to bring a system or systems into compliance with the applicable standards.
- Testing confirming that corrective action has been performed properly.
- Additional costs for testing premiums required due to the Contractors failure to properly schedule or otherwise have a system or assembly tested at the appropriate time.

IDENTIFIED TESTING CATEGORY
Paid for by the Owner

The Contractor shall note that while the Owner is paying for the following tests, that the Contractor and Contractors' Subcontractors are obligated under the Base Bid to provide all required documentation, and certifications required to support the Owner and Architect required as part of the Special Inspections Chapter 17 of the Rhode Island State Building Code (RISBC). These documents are required to achieve the Certificate of Occupancy for the Facility and the timeliness of the documents are critical and all the costs associated with the administration, scheduling and procurement of required documents to support the Owner and Architect are part of the Contractors Base Bid Cost. Additionally, this work effort includes providing the Contractors Statement of Responsibility as required by the RISBC.

- All Structural Tests and Special Inspections required of IBC Chapter 17
- All testing required of the Technical Specifications Division 01 through Division 32

- Concrete slabs foundations & footings
- Site concrete sidewalks, slabs and paving.
- Structural Steel
- Masonry Construction
- Compaction Testing below Footings, Slabs, Exterior sidewalks, slabs and bituminous paving

13.28 On Site Water Use

In preparing the cost of the Project the Contractor shall take notice that on-site water can be made available. In the event the system is not used as intended and/or otherwise abused, the Owner will terminate the service at the expense of the Contractor. The Contractor may also choose to provide water from an off-site source.

The Contractor shall make provisions to provide water to be used in all construction operations, including but not limited to masonry work, concrete, temporary fire protection, construction housekeeping operations including rinsing of vehicles and concrete trucks, all dust control, drinking water for construction team members, testing of systems and any and all other operations requiring water. All costs associated with providing and maintaining the required on-site and/or off-site water shall be included as part of the Base Bid Costs for the Project.

13.29 Field Reports/Actions

The Contractor acknowledges that action items outlined in field reports prepared by the Project Architect, Project Engineer and the Owner's Project Manager that call out or otherwise identify deficiencies in construction and/or other project requirements shall be corrected as noted. Field reports delineating issues shall be considered part of the project document path and if the Contractor disagrees with the noted reported deficiency, the Contractor shall promptly document such disagreement for review by the Architect and the Owner's Representative.

13.30 Loading

Do not load any part of the Work involved in this Contract, during construction, with a load greater than that calculated to carry with safety. Should any accidents or damage occur through any violation of this requirement, the Contractor shall be held responsible under his Contract and Bond. When, in the opinion of the Architect, portions of the structure appear to be overloaded, it shall be the Contractor's responsibility to prove otherwise, or the Contractor shall follow the instructions of the Architect in connection with reduction of the loads.

Additionally, provide as required proper matting and supporting engineering data for matting required for the erection and operations of Cranes.

13.31 Working Conditions

The Contractor must confer with the Owner and coordinate the Work of the project so as to ensure campus activities can continue during the 24 hour per day, seven day per week operations, especially as required in sections 13.12, 13.20, 13.21, 13.22, 13.23. The Contractor must coordinate the Work in accordance with building operations.

END OF SECTION

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Contract description.

B. Contractor's use of site and premises.

C. Owner occupancy.

D. Hazardous Material Suspicion.

1.02 CONTRACT DESCRIPTION

A. Work of the Project includes the demolition of two buildings at the site, exterior renovations to an existing building at the site and construction of a new garage.

B. Perform the Work of the Contract under a stipulated sum Contract with the Owner in accordance with the Conditions of Contract.

C. The Work of the Contract is identified in the Project Manual and on the Drawings.

1.03 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limit use of the site and premises to allow:
1. Owner occupancy of portions of the site throughout construction.

1.04 OWNER OCCUPANCY

A. The Owner intends to occupy the existing building that is being renovated during construction and portions of the site during construction of the new building outside the project limit lines for the new building.

1.05 HAZARDOUS MATERIAL SUSPICION

A. If, during the course of construction, the Contractor suspects a material to contain asbestos, all work involving the material is to be stopped and the Architect notified immediately of the suspicion. Until the material is confirmed to be safe or tested and determined to be an asbestos containing material, the Contractor is to assume it contains asbestos and is to avoid contact. Upon notification of its composition the Architect will determine the course of action and inform the Contractor accordingly.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Schedule of values.

B. Applications for payment.

C. Sales Tax Exemption

D. Change procedures.

E. Defect assessment.

F. Unit Prices

1.02 SCHEDULE OF VALUES

A. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet

B. Submit Schedule of Values in duplicate, one copyrighted original and one copy, within fifteen (15) days after date of receipt of a Purchase Order from RI State Department of Administration, Division of Purchases.

C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization, bonds and insurance.

D. Include in each line item, the amount of Allowances specified in Section 01 21 00 if occurring. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.03 APPLICATIONS FOR PAYMENT

A. Submit each application on an original copyrighted AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet, accompanied by three copies.
   1. Individually sign and notarize, and emboss with notary's official seal, the original and each of the three copies.
   2. Applications not including original copyrighted AIA G702, and G703 Forms, will be rejected, and returned for resubmittal.

3. Applications not properly signed and notarized will be rejected, and returned for resubmittal.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Provide one copy of the updated construction schedule with each Application for Payment submission.
   1. Provide a statement signed by the Contractor's firm principal certifying that there are no unidentified outstanding claims for delay.

D. Include with each monthly Application for Payment, following the first application, one copy of the Certified Monthly Payroll Record for the previous month's pay period.

E. Payment Period: Submit at intervals stipulated in the Agreement.

F. Submit with transmittal letter as specified for Submittals in Section 01 33 00.

G. Beginning with the second Application for Payment, Contractor's right to payment must be substantiated by documenting, on a copy of the Waiver of Lien Form included in Document 00 65 19.16 - Waiver of Lien Form in this Project Manual, that payment monies due, less retainage not exceeding ten percent, have been paid in full to subcontractor and suppliers for work, materials, or rental of equipment billed for under specific line item numbers in the immediately preceding application.

H. Substantiating Data: When the Architect requires substantiating information, submit data justifying dollar amounts in question. Include the following with the Application for Payment :
   1. Current construction photographs specified in Section 01 33 00.
   2. Record Documents as specified in Section 01 78 00, for review by the Owner which will be returned to the Contractor.
   3. Affidavits attesting to off-site stored products.
   4. Construction progress schedules, revised and current as specified in Section 01 33 00.

1.06 SALES TAX EXEMPTION

A. Owner is exempt from sales tax on products permanently incorporated in Work of the Project.
   1. Obtain sales tax exemption certificate number from Owner.
   2. Place exemption certificate number on invoice for materials incorporated in the Work of the Project.
   3. Furnish copies of invoices to Owner.
   4. Upon completion of Work, file a notarized statement with Owner that all purchases made under exemption certificate were entitled to be exempt.
   5. Pay legally assessed penalties for improper use of exemption certificate number.

1.04 CHANGE PROCEDURES

A. Submittals: Submit name of the individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. The Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time by issuing supplemental instructions on AIA Form G710

C. The Architect may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within fifteen (15) days.

D. The Contractor may propose changes by submitting a request for change to the Architect, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation, and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01 60 00.

E. Stipulated Sum Change Order: Based on Proposal Request, and Contractor's fixed price quotation, or Contractor's request for a Change Order as approved by Architect.

F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work that are not pre-determined, execute the Work under a Construction Change Directive. Changes in the Contract Sum or Contract Time will be computed as specified for a Time and Material Change Order.

G. Construction Change Directive: Architect may issue a directive, on AIA Form G713 Construction Change Directive signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in the Contract Sum or Contract Time. Promptly execute the change.

H. Time and Material Change Order: Submit an itemized account and supporting data after completion of the change, within the time limits indicated in the Conditions of the Contract. The Architect will determine the change allowable in the Contract Sum and Contract Time as provided in the Contract Documents.

I. Maintain detailed records of work done on a Time and Material basis. Provide full information required for an evaluation of the proposed changes, and to substantiate costs for the changes in the Work.

J. Document each quotation for a change in cost or time with sufficient data to allow an evaluation of the quotation. Provide detailed breakdown of costs and estimates for labor and materials including a detailed breakdown for subcontractor's or vendor's Work. Include copies of written quotations from subcontractors or vendors.

K. Change Order Forms: AIA G701 Change Order.

L. Execution of Change Orders: The Architect will issue Change Orders for signatures of the parties as provided in the Conditions of the Contract.

M. Correlation Of Contractor Submittals:
   1. Promptly revise the Schedule of Values and the Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

2. Promptly revise progress schedules to reflect any change in the Contract Time, revise sub-schedules to adjust times for any other items of work affected by the change, and resubmit.
3. Promptly enter changes in the Project Record Documents.

N. Change Order Overhead and Profit

1. When determining the total cost for a Change Order, the Contractor, Subcontractor and Sub-subcontractor is allowed the following maximum amounts for the combined overhead and profit to be added to the sum amount.

   a. For the Contractor, for Work performed by the Contractor's own forces, 10 percent of the cost.

   b. For the Contractor, for Work performed by the Contractor's Subcontractor, 6 percent of the amount due the Subcontractor.

   c. For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, 10 percent of the cost.

   d. For each Subcontractor, for Work performed by the Subcontractor's Sub-subcontractors,
   6 percent of the amount due the Sub-subcontractor.

   e. Overhead and profit is to include the Contractor's project management and supervisory costs, all administrative expenses and personnel, change estimate preparation, mobilization, setup & break-down, meetings, all safety related costs, cleanup costs and storage costs pertaining to the changes in the work.

   f. In order to facilitate checking of quotations for extras or credits, all proposals shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over $500.00 be approved without such itemization.

1.05 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Architect, it is not practical to remove and replace the Work, the Architect will direct an appropriate remedy or adjust payment.

C. The defective Work may remain, but the unit sum will be adjusted to a new sum at the discretion of the Architect.

D. The defective Work will be partially repaired to the instructions of the Architect, and the unit sum will be adjusted to a new sum at the discretion of the Architect.

E. The individual Specification Sections may modify these options or may identify a specific formula or percentage sum reduction.

F. The authority of the Architect to assess the defect and identify a payment adjustment is final.

G. Non-Payment for Rejected Products: Payment will not be made for rejected products for any of the following:
1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

1.06 UNIT PRICES

A. Authority: Measurement methods are delineated in the individual specification Sections.

B. Measurement methods delineated in the individual specification Sections complement the criteria of this section. In case of conflict, the requirements of the individual specification Section govern.

C. Take measurements and compute quantities. The Architect will verify measurements and quantities.

D. Unit Quantities: The quantities and measurements indicated in the Bid Form are for contract purposes only. The quantities and measurements supplied or placed in the Work shall determine payment.
1. When the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum contracted.
2. When the actual Work requires a 25 percent or greater change in quantity than those quantities indicated, the Owner or Contractor may claim for a Contract Price adjustment.

E. Unit Price amount includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

F. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Architect multiplied by the unit sum for Work which is incorporated in or made necessary by the Work.

G. Measurement of Quantities:
1. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year.
2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
3. Metering Devices: Inspected, tested and certified by the applicable State department within the past year.
4. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
5. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
6. Measurement by Area: Measured by square dimension using mean length and width or radius.

7. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
8. Stipulated Sum Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

H. See Bid Form for schedule of Unit Prices.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Allowances.

B. Testing and inspection allowances.

1.02 ALLOWANCES

A. Costs Included in Cash Allowances: Cost of product to Contractor or Subcontractor, labor for installation and finishing, less applicable trade discounts; delivery to site, and applicable taxes

B. Costs Not Included in Cash Allowances But Included in the Contract Sum: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage.

C. Architect Responsibilities:
1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
2. Select products in consultation with Owner and transmit decision to Contractor.
3. Prepare Change Order.

D. Contractor Responsibilities:
1. Assist Architect in selection of products, suppliers and installers.
2. Obtain proposals from suppliers and installers and offer recommendations.
3. On notification of selection by Architect, execute purchase agreement with designated supplier and installer.
4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Change Order.

F. Allowances Schedule:

1. **Allowance No. 1: Modifications necessary to new construction due to unforeseen conditions:**
Include the sum of **fifteen thousand dollars ($ 15,000.00)** for modified new construction and repairs required due to unforeseen conditions

1.03 TESTING AND INSPECTION ALLOWANCES

A. Costs included in Testing and Inspecting Allowances: Cost of engaging a testing and inspecting agency; execution of tests and inspecting; and reporting results.

B. Costs not included in the Testing and Inspecting Allowance but included in the Contract Sum:
   1. Costs of incidental labor and facilities required to assist testing or inspecting agency.
   2. Costs of testing services used by Contractor separate from Contract Document requirements.
   3. Costs of retesting upon failure of previous tests as determined by Architect.

C. Payment Procedures:
   1. Submit one copy of the inspecting or testing firm's invoice with each copy of the next application for payment.
   2. Pay invoice on approval by Architect.

D. Testing and Inspecting Allowances Schedule:

   1. **Allowance No. 2:** Include the sum of **three thousand five hundred dollars ($ 3,500.00)** for payment of testing, or inspecting, laboratory services for compacted soils, concrete and structural welds as required by the pertinent specification sections.

E. Differences in cost will be adjusted by Change Order.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 22 0

ALTERNATES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Alternates.

1.02 ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.

B. Coordinate related work and modify surrounding work as required.

C. Schedule of Alternates:

1. Alternate No. 1: Insulate Garage:
This Alternate contemplates the addition to the Base Bid all work associated with the installation of wall and roof insulation in the new garage as identified and shown on the drawings.

2. Alternate No. 2: Insulated Garage Doors:
This Alternate contemplates the addition to the Base Bid all work associated with the installation of insulated roll-up garage doors in the new garage as identified and shown on the drawings.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 31 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Coordination and project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

1.02 COORDINATION AND PROJECT CONDITIONS

A. Coordinate the scheduling, submittals, and the Work of the various Sections of the Project Manual to ensure an efficient and orderly sequence of the installation of interdependent construction elements with provisions for accommodating the items installed later.

B. Verify that the utility requirements and characteristics of the operating equipment are compatible with the building utilities. Coordinate the Work of the various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate the space requirements, supports, and installation of the mechanical, plumbing and electrical Work, which are indicated diagrammatically on the Drawings. Follow the routing shown for the pipes, ducts, and conduit, as closely as practicable; place runs parallel with the lines of the building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
   1. The Contractor is to provide coordination drawings indicating size and locations of all mechanical, plumbing, fire protection and electrical work to confirm conflicts do not exist between systems. Submit four hard copies to the Architect for review prior to purchasing and fabrication of materials.

D. In finished areas except as otherwise indicated, conceal the pipes, ducts, and wiring within the construction. Coordinate the locations of fixtures and outlets with the finish elements.

E. Coordinate the completion and clean up of the Work of the separate Sections in preparation for Substantial Completion.

F. After the Owner's occupancy of the premises, coordinate access to the site for correction of the defective Work and the Work not in accordance with the Contract Documents, to minimize disruption of the Owner's activities.

1.03 PRECONSTRUCTION MEETING

A. The Architect will schedule a meeting after a Purchase Order is issued to the Contractor by the RI State Department of Administration, Division of Purchases.

B. Attendance Required: Owner, Architect, and Contractor.

C. Agenda:
1. Execution of the Owner-Contractor Agreement.
2. Submission of the executed bonds and insurance certificates.
3. Distribution of the Contract Documents.
4. Submission of a list of Subcontractors, a list of products, schedule of values, and a progress schedule.
5. Designation of the personnel representing the parties in the Contract, and the Architect.
6. The procedures and processing of the field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures.
7. Scheduling.

D. Record the minutes and distribute copies within two days after the meeting to the participants, with two copies to the Architect, the Owner, the participants, and those affected by the decisions made.

1.04 SITE MOBILIZATION MEETING

A. The Architect will schedule a meeting at the Project site prior to the Contractor's occupancy.

B. Attendance Required: The Owner, Architect, Special Consultants, and, Contractor, the Contractor's Superintendent, and major Subcontractors.

C. Agenda:
1. Use of the premises by the Owner and the Contractor.
2. The Owner's requirements and occupancy.
3. Construction facilities and controls provided by the Owner.
4. Temporary utilities provided by the Owner.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Application for payment procedures.
9. Procedures for testing.
10. Procedures for maintaining the record documents.
11. Requirements for start-up of the equipment.
12. Inspection and acceptance of the equipment put into service during the construction period.

D. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Architect, Owner, participants, and those affected by the decisions made.

1.05 PROGRESS MEETINGS

A. Schedule and administer the meetings throughout the progress of the Work at maximum bi-weekly (14 day) intervals.

B. Make arrangements for the meetings, prepare the agenda with copies for the participants, and preside at the meetings.

C. Attendance Required: The job superintendent, major subcontractors and suppliers, the Owner, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review the minutes of previous meetings.
2. Review of the Work progress.
3. Field observations, problems, and decisions.
4. Identification of the problems which impede the planned progress.
5. Review of the submittals schedule and status of the submittals.
6. Review of the off-site fabrication and delivery schedules.
7. Maintenance of the progress schedule.
8. Corrective measures to regain the projected schedules.
9. Planned progress during the succeeding work period.
10. Coordination of the projected progress.
11. Maintenance of the quality and work standards.
12. Effect of the proposed changes on the progress schedule and coordination.
13. Other business relating to the Work.

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Architect, Owner, participants, and those affected by the decisions made.

1.06 PREINSTALLATION MEETING

A. When required in the individual specification Sections, convene a preinstallation meeting at the site prior to commencing the Work of the Section.

B. Require attendance of the parties directly affecting, or affected by, the Work of the specific Section.

C. Notify the Architect four days in advance of the meeting date.

D. Prepare an agenda and preside at the meeting:
1. Review the conditions of installation, preparation and installation procedures.
2. Review coordination with the related work.

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Architect, Owner, participants, and those affected by the decisions made.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Method for Submission of Shop Drawings and Product Data

E. Product data.

F. Shop drawings.

G. Samples.

H. Design data.

I. Test reports.

J. Certificates.

K. Manufacturer's instructions.

L. Manufacturer's field reports.

M. Erection drawings.

N. Construction photographs.

1.02 SUBMITTAL PROCEDURES

A. Master List Submittal:
   1. Submit a master list of the required submittals with a proposed date for each item to be submitted.
   2. Show the date submittal was sent, days since submittal was sent, status of submittal, date submittal was received in return, and any date associated with resubmittals.
   3. Up date master list with each submission and response.
   4. Issue copy of master list at least monthly to the Architect.

B. Transmit each submittal with a transmittal form.

C. Sequentially number the transmittal form. Mark the revised submittals with the original number and a sequential alphabetic suffix.

D. Identify the Project, Contractor, subcontractor and supplier; the pertinent drawing and detail number, and the specification Section number, appropriate to the submittal.

E. Apply a Contractor's stamp, signed or initialed, certifying that the review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of the information is in accordance with the requirements of the Work and the Contract Documents.

F. Schedule submittals to expedite the Project, and deliver to the Architect at their business address. Coordinate the submission of related items.

G. For each submittal for review, allow fifteen (15) days excluding the delivery time to and from the Contractor.

H. Identify the variations from the Contract Documents and the Product or system limitations that may be detrimental to a successful performance of the completed Work.

I. Allow space on the submittals for the Contractor's and the Architect's review stamps.

J. When revised for resubmission, identify the changes made since the previous submission.

K. Distribute copies of the reviewed submittals as appropriate. Instruct the parties to promptly report an inability to comply with the Contract requirements.

L. Submittals not requested will not be recognized or processed.

M. The Contractor will compensate the Architect and all consulting Engineers for services performed reviewing submittals beyond the original review and two follow-up reviews of the same product, material, sample or assembly. The compensation will be made through a credit change order that will reduce the total contract amount.

1.03 CONSTRUCTION PROGRESS SCHEDULES

A. Submit preliminary outline Schedules within fifteen (15) days after the date of receipt of a Purchase Order from the State of Rhode Island Department of Administration, Division of Purchases for coordination with the Owner's requirements. After a review, submit detailed schedules within fifteen (15) days modified to accommodate the revisions recommended by the Architect.

B. Submit revised Progress Schedules with each Application for Payment.

C. Distribute copies of the reviewed schedules to the Project site file, subcontractors, suppliers, and other concerned parties.

D. Instruct the recipients to promptly report, in writing, the problems anticipated by the projections indicated in the schedules.

E. Submit a computer generated horizontal bar chart with a separate line for each major portion of the Work or operation, or section of the Work, identifying the first workday of each week.

F. Show a complete sequence of construction by activity, identifying the Work of separate stages and other logically grouped activities. Indicate the early and late start, the early and late finish, float dates, and the duration.

G. Indicate an estimated percentage of completion for each item of the Work at each submission.

H. Provide a separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished Products and Products identified under Allowances, if any, and the dates reviewed submittals will be required from the Architect. Indicate the decision dates for selection of the finishes.

I. Indicate the delivery dates for Owner furnished Products, and for Products identified under Allowances.

J. Revisions to Schedules:
   1. Indicate the progress of each activity to the date of submittal, and the projected completion date of each activity.
   2. Identify the activities modified since the previous submittal, major changes in the scope, and other identifiable changes.
   3. Provide a narrative report to define the problem areas, the anticipated delays, and impact on the Schedule. Report the corrective action taken, or proposed, and its effect including the effect of changes on the schedules of separate contractors.

1.04 PROPOSED PRODUCTS LIST

A. Within fifteen (15) days after the date of receipt of a Purchase Order from the State of Rhode Island Department of Administration, Division of Purchases, submit a list of major products proposed for use, with the name of the manufacturer, the trade name, and the model number of each product.

B. For the products specified only by reference standards, give the manufacturer, trade name, model or catalog designation, and reference standards.

C. With each product listed, indicate the submittal requirements specified to be adhered to, and an indication of relevant "long-lead-time" information, when appropriate.

1.05 METHOD FOR SUBMISSION OF SHOP DRAWING AND PRODUCT DATA

A. Method of electronic or hard copy delivery of shop drawing and data submittals is to be discussed with Architect at Preconstruction meeting.
   Use one of the three methods listed below:
   1. Use an internet-based system agreed upon by the Architect and Contractor.
      Comply with required transmittal and data formats using numbering system approved by Architect.

Assemble submittal package into a single indexed file incorporating submittal and cover sheet explaining project name, number, Architect, Contractor and submittal number.

2. Email an electronic format (PDF) copy to the Architect.
   Comply with required transmittal and data formats using numbering system approved by Architect.
   Assemble submittal package into a single indexed file incorporating submittal and cover sheet explaining project name, number, Architect, Contractor and submittal number.
3. Hard copies delivered to the Architect are to be submitted with the number of copies that the Contractor requires, plus three copies the Architect will retain.

B. All shop drawings 24” x 36” or larger are to be delivered to the Architect in hard copy format as noted in Method 3 above.

C. All submittals are to include a Contractor’s review stamp confirming approval prior to submission to the Architect.

D. The Architect will return the reviewed submittal to the Contractor for distribution to subcontractors, suppliers, fabricators, and others as necessary for proper performance of the Work.

E. Submit color samples on actual product material for final color selection by sending them via postal or delivery service directly to the Architect’s office.

1.06 PRODUCT DATA

A. Product Data: Submit to the Architect for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Provide copies and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Mark each copy to identify the applicable products, models, options, and other data. Supplement the manufacturers' standard data to provide the information specific to this Project.

C. Indicate the product utility and electrical characteristics, the utility connection requirements, and the location of utility outlets for service for functional equipment and appliances.

D. After receiving approved submittals, distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01 78 00.

1.07 SHOP DRAWINGS

A. Shop Drawings: Submit to the Architect for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Indicate the special utility and electrical characteristics, the utility connection requirements, and the location of utility outlets for service for functional equipment and appliances.

C. Submit the number of copies that the Contractor requires, plus three copies the Architect will retain.

1.08 SAMPLES

A. Samples: Submit to the Architect for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Produce duplicates and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Samples For Selection as Specified in Product Sections:
1. Submit to the Architect for aesthetic, color, or finish selection.
2. Submit samples of the finishes, indicating colors, texture, and patterns for the Architect's selection.
3. After review, produce duplicates and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

C. Submit samples to illustrate the functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate the sample submittals for interfacing Work.

D. Include identification on each sample, with the full Project information.

E. Submit the number of samples specified in the individual specification Sections; the Architect will retain one sample.

F. Reviewed samples, which may be used in the Work, are indicated in the individual specification Sections.

G. Samples will not be used for testing purposes unless they are specifically stated to be in the specification Section.

1.09 DESIGN DATA

A. Submit for the Architect's knowledge as contract administrator.

B. Submit for information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

1.10 TEST REPORTS

A. Submit for the Architect's knowledge as contract administrator.

B. Submit test reports for information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

1.11 CERTIFICATES

A. When specified in the individual specification Sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to the Architect, in the quantities specified for the Product Data.

B. Indicate that the material or product conforms to or exceeds the specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on the material or product, but must be acceptable to the Architect.

1.12 MANUFACTURER'S INSTRUCTIONS

A. When specified in the individual specification Sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to the Architect for delivery to the Owner in the quantities specified for Product Data.

B. Indicate the special procedures, and the perimeter conditions requiring special attention, and the special environmental criteria required for application or installation.

1.13 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the Architect's benefit as contract administrator.

B. Submit the report in duplicate within thirty (30) days of observation to the Architect for information.

C. Submit for information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

1.14 ERECTION DRAWINGS

A. Submit drawings for the Architect's benefit as contract administrator.

B. Submit for information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by the Architect.

1.15 CONSTRUCTION PHOTOGRAPHS

A. Take digital photographs of the site and construction throughout the progress of the Work produced by an experienced photographer.

B. Provide minimum ten (10) – photographs per week. All photographs are to have the date imprinted on the face of the photograph.

C. Take photographs from differing directions, as appropriate, and as may be requested by the Architect and the Owner, indicating the relative progress of the Work.

D. Submit all digital photographs on a compact disc in J-PEG or PDF format at the end of the project as part of the closeout documents. Submit photographs during construction if requested by the Architect.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

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SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Quality control and control of installation.

B. Verification of Credentials and Licenses.

C. Safety Awareness Policy

D. Tolerances

E. References.

F. Mock-up requirements.

G. Testing and inspection services.

H. Manufacturers' field services.

1.02 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor a quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of the specified quality.

B. Comply with the manufacturers' instructions, including each step in sequence.

C. When the manufacturers' instructions conflict with the Contract Documents, request a clarification from the Architect before proceeding.

D. Comply with the specified standards as a minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform the Work by persons qualified to produce the required and specified quality.

F. Verify that field measurements are as indicated on the Shop Drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

H. Field measurements

1. Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication scheduled with construction progress to avoid construction delays.

I. The Contractor, by approving and submitting Shop Drawings, Product Data, Samples, and similar submittals thereby represent that they have determined and verified all dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously accepted Shop Drawings, Product Data, Samples, or similar submittals and verification of compliance with all the requirements of the Contract Documents. The accuracy of all such information is the responsibility of the Contractor. In reviewing Shop Drawings, Product Data, Samples, and similar submittals the Architect shall be entitled to rely upon the Contractor's representation that such information is correct and accurate.

J. Concrete Installation Quality Control
1. **NO** concrete is to be installed without prior inspection by the Architect of all forms, reinforcement and vapor barriers and receipt of a written approval by the Architect.
2. The Architect is to be notified a minimum of three (3) working days prior to each pour.
3. All inconsistencies will be corrected, re-inspected and approved by the Architect prior to installation of the concrete.

1.03 VERIFICATION OF CREDENTIALS AND LICENSES

A. All persons employed on the project site must have appropriate and current credentials and licenses in their possession, at the project site, for the work they are performing.

B. Be forewarned that state resident inspectors will be checking for verification of credentials and licenses of both union and non-union persons, in their onsite inspections.

C. State resident inspectors will also be reviewing Contractor's Certified Monthly Payroll Records for conformance with RI State Prevailing Wage Rate requirements.

D. Those persons without the appropriate credentials and licenses will be subject to dismissal from the project site.

1.04 SAFETY AWARENESS POLICY

A. In accordance with Rhode Island General Laws, Title 28, S28-20-35 5.1 Safety awareness program required. (Effective January 1, 2002.) all contractors who bid on municipal and state construction projects with a total project cost of One Hundred Thousand Dollars($100,000.00) or more, shall have an OSHA “ten hour safety construction program” for their on-site employees. The training shall utilize instructors trained by the Occupational Safety Health Administration, using OSHA approved curriculum. Graduates shall receive a card from the U. S. Department of Labor Occupational Safety and Health Administration certifying the successful completion of the training course. The director of the Rhode Island Department of Labor and Training shall promulgate rules, regulations and penalties to enforce provisions of this section.

B. The Contractor is required to conform to all applicable OSHA requirements on this project.

1.05 TOLERANCES

A. Monitor the fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with the manufacturers' tolerances. When the manufacturers' tolerances conflict with the Contract Documents, request a clarification from the Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.06 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by the date of issue current on the date of the Contract Documents, except where a specific date is established by code.

C. Obtain copies of the standards where required by the product specification Sections.

D. When the specified reference standards conflict with the Contract Documents, request a clarification from the Architect before proceeding.

E. Neither the contractual relationships, duties, nor responsibilities of the parties in the Contract, nor those of the Architect, shall be altered from the Contract Documents by mention or inference otherwise in reference documents.

1.07 MOCK-UP REQUIREMENTS

A. Tests will be performed under the provisions identified in this Section and identified in the respective product specification Sections.

B. Assemble and erect the specified items with the specified attachment and anchorage devices, flashing, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where the mock-up has been accepted by the Architect and is specified in the product specification Sections to be removed, remove the mock-up and clear the area when directed to do so by the Architect.

1.08 TESTING AND INSPECTION SERVICES

A. The Contractor will submit the name of an independent firm to the Architect for approval by the Owner, to perform the testing and inspection services. All fees to be paid to the independent firm will be deducted from the Testing Allowance stated in Section 01 21 00. The Contractor is to submit the testing firm's invoice as backup to be included with a Change Order deducting the amount from the Testing Allowance.

B. The independent firm will perform the tests, inspections and other services specified in the individual specification Sections.
   1. Laboratory: Authorized to operate in the location in which the Project is located.
   2. Laboratory Staff: Maintain a full time registered Engineer on staff to review the services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either the National Bureau of Standards or to the accepted values of natural physical constants.

C. Testing, inspections and source quality control may occur on or off the project site. Perform off-site testing as required by the Architect.

D. Reports will be submitted by the independent firm to the Architect, Owner and the Contractor, in duplicate, or electronically, indicating the observations and results of tests and indicating the compliance or non-compliance with Contract Documents.

E. Cooperate with the independent firm; furnish samples of the materials, design mix, equipment, tools, storage, safe access, and the assistance by incidental labor as requested.
   1. Notify the Architect and the independent firm 24 hours prior to the expected time for operations requiring services.
   2. Arrange with the independent firm and pay for additional samples and tests required for the Contractor's use.

F. Testing and employment of the testing firm shall not relieve the Contractor of an obligation to perform the Work in accordance with the requirements of the Contract Documents.

G. Re-testing or re-inspection required because of a non-conformance to the specified requirements is to be performed by the same independent firm on instructions by the Architect. Payment for the re-testing or re-inspection will be the Contractor's responsibility.

H. Testing Firm Responsibilities:
   1. Test samples of mixes submitted by the Contractor.
   2. Provide qualified personnel at the site. Cooperate with the Architect and the Contractor in performance of services.
   3. Perform specified sampling and testing of the products in accordance with the specified standards.
   4. Ascertain compliance of the materials and mixes with the requirements of the Contract Documents.
   5. Promptly notify the Architect and the Contractor of observed irregularities or non-conformance of the Work or products.
   6. Attend the preconstruction meetings and the progress meetings.

I. Testing Firm Reports: After each test, promptly submit two copies of the report to the Architect and to the Contractor. When requested by the Architect, provide an interpretation of the test results. Include the following:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector.
   4. Date and time of sampling or inspection.
   5. Identification of product and specifications section.
   6. Location in the Project.
   7. Type of inspection or test.
   8. Date of test.
   9. Results of tests.
   10. Conformance with Contract Documents.

J. Limits on Testing Firm:
   1. Testing Firm may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.
   2. Testing Firm may not approve or accept any portion of the Work.
   3. Testing Firm may not assume any duties of the Contractor.
   4. Testing Firm has no authority to stop the Work.

1.09 MANUFACTURERS' FIELD SERVICES

A. When specified in the individual specification Sections, require the material or Product suppliers, or manufacturers, to provide qualified staff personnel to observe the site conditions, the conditions of the surfaces and installation, the quality of workmanship, the start-up of equipment, or test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit the qualifications of the observer to the Architect thirty (30) days in advance of the required observations. The Observer is subject to approval by the Architect.

C. Report the observations and the site decisions or instructions given to the applicators or installers that are supplemental or contrary to the manufacturers' written instructions.

D. Refer to Section 01 33 00 - SUBMITTAL PROCEDURES, MANUFACTURER'S FIELD REPORTS article.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not used.

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities:
1. Temporary electricity.
2. Temporary lighting for construction purposes.
3. Temporary heating.
4. Temporary cooling.
5. Temporary ventilation.
6. Telephone service.
7. Temporary water service.
8. Temporary sanitary facilities.

B. Construction Facilities:
1. Field offices, trailers and sheds.
2. Temporary scaffolding
3. Hoisting
4. Vehicular access.
5. Parking.
6. Progress cleaning and waste removal.

C. Temporary Controls:
1. Barriers.
2. Enclosures and fencing.
3. Security.
4. Water control.
5. Dust control.
6. Erosion and sediment control.
7. Noise control.
8. Pest control.
9. Pollution control.
10. Rodent control.

D. Removal of utilities, facilities, and controls.

1.02 TEMPORARY ELECTRICITY

A. The Owner will pay the cost of electricity used. Utilize the Owner’s existing power service. Exercise measures to conserve energy.

B. Provide a temporary electric feeder from an existing building, or from the electrical service at the location as directed by the Architect. Do not disrupt the Owner's use of service.

C. Complement the existing power service capacity and characteristics as required for construction operations.

D. Provide power outlets, with branch wiring and distribution boxes as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.

E. Permanent convenience receptacles may be utilized during construction.

1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.

B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

C. Provide and maintain 0.25 watt/sq ft lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails and lamps for specified lighting levels.

E. Maintain lighting and provide routine repairs.

F. Permanent building lighting may be utilized during construction.

1.04 TEMPORARY HEATING

A. Provide and pay for heating devices and heat as needed to maintain the specified conditions for construction operations.

B. Enclose the building prior to activating the temporary heat in accordance with the Enclosure article in this Section.

C. Prior to the operation of permanent equipment for temporary heating purposes, verify that the installation is approved for operation, the equipment is lubricated and the filters are in place. Provide and pay for the operation, maintenance, and the regular replacement of filters and worn or consumed parts.

D. Maintain a minimum ambient temperature of 50 degrees F in the areas where construction is in progress, unless indicated otherwise in the product Sections.

1.05 TEMPORARY COOLING

A. Provide and pay for cooling devices and cooling as needed to maintain the specified conditions for construction operations.

B. Enclose the building prior to activating the temporary cooling in accordance with the Enclosure article in this Section.

C. Maintain a maximum ambient temperature of 80 degrees F in the areas where construction is in progress, unless indicated otherwise in the specifications.

1.06 TEMPORARY VENTILATION

A. Ventilate the enclosed area to achieve a curing of materials, to dissipate humidity, and to prevent the accumulation of dust, fumes, vapors, or gases.

B. Provide temporary fan units as required to maintain clean air for construction operations.

1.07 TELEPHONE SERVICE

A. The Contractor is required to insure the on-site Project Supervisor maintains a cell phone in their possession for the duration of the Contract.

1.08 TEMPORARY WATER SERVICE

A. The Owner will pay the cost of temporary water. Exercise measures to conserve. Utilize the Owner's existing water system, extend and supplement with temporary devices as needed to maintain the specified conditions for construction operations.

B. Extend branch piping with outlets located so that water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.09 TEMPORARY SANITARY FACILITIES

A. Provide and maintain the required facilities and enclosures. Existing facility use is not permitted. Provide facilities at the time of project mobilization.

1.10 FIELD OFFICES, TRAILERS AND SHEDS

A. The existing building may not be used for an office during construction. It is the Contractor’s option to provide a trailer and place it in a location approved by the Architect and Owner.

B. Storage Areas, Trailers and Sheds: Size to the storage requirements for the products of the individual Sections, allowing for access and orderly provision for the maintenance and for the inspection of Products to the requirements of Section 01 60 00.

C. Removal: At the completion of the Work remove the buildings, foundations, utility services, and debris. Restore the areas.

1.11 TEMPORARY SCAFFOLDING

A. Contractor is to provide temporary scaffolding as necessary for construction purposes.

B. The scaffolding is to be braced properly, assembled and installed as required to meet all OSHA requirements.

C. Remove from the site all scaffolding, associated bracing and supports upon completion of construction. Repair all surfaces and site to original condition including all landscaping, grass and hardscape.

D. Scaffolding must allow for unimpeded entry and egress from the building at all times when it is occupied by employees or the public.

1.12 HOISTING

A. Contractor is responsible for all hoisting required to facilitate, serve, stock, clean, and complete the Work. Include all costs for Operating Engines, fuel, delivery and removal, mobilization, staging, protection of grades and surfaces, and equipment. All surfaces damaged by hoisting equipment or crane are to be cleaned and repaired to match original condition. All damaged grass is to receive loam and seed to match existing.

1.13 VEHICULAR ACCESS

A. Provide unimpeded access for emergency vehicles. Maintain 20 foot width driveways with turning space between and around combustible materials.

B. Provide and maintain access to fire hydrants and control valves free of obstructions.

C. Remove mud from construction vehicle wheels before entering streets. Cleanup dirt, rocks, and debris that fall on street from construction vehicles.

D. Use designated existing on-site roads for construction traffic.

1.14 PARKING

A. Arrange for temporary surface parking areas to accommodate the construction personnel.

B. Location must be approved by the Owner.

C. Use of existing parking facilities by construction personnel is permitted.

D. When site space is not adequate, arrange through the Owner for additional off-site parking.

E. Tracked vehicles are not allowed on paved areas.

1.15 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain the site in a clean and orderly condition.

B. Collect and remove waste materials, debris, and rubbish from the site periodically, weekly, or daily, as necessary to prevent an on-site accumulation of waste material, debris, and rubbish, and dispose off-site.

C. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

D. The General Contractor is responsible to provide and maintain dumpsters for all trades unless other arrangements are made with Subcontractors.

E. Remove debris and rubbish from pipe chases, plenums and other or remote spaces, prior to enclosing the space.

F. Sweep and vacuum clean the interior areas prior to the start of surface finishing, and continue cleaning to eliminate dust.

1.16 BARRIERS

A. Provide barriers to prevent unauthorized entry to the construction areas to allow for the Owner's use of the site and to protect existing facilities and adjacent properties from damage from the construction operations, or demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way, or for public access to and egress from the existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.17 ENCLOSURES AND FENCING

A. Construction: Commercial grade chain link fence.
1. Provide a six (6) foot high fence around the construction site; equip with vehicular and pedestrian gates with locks. Provide one set of keys to all gates to the owner.

B. Exterior Enclosures:
1. Provide a temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for the products, to allow for temporary heating and maintenance of the required ambient temperatures identified in the individual specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.18 SECURITY

A. Security Program:
1. Protect the Work, the existing premises, or the Owner's operations from theft, vandalism, and unauthorized entry.
2. Initiate the program at the mobilization.
3. Maintain the program throughout the construction period until Owner occupancy.

1.19 WATER CONTROL

A. Grade the site to drain. Maintain excavations free of water. Provide, operate, and maintain the pumping equipment.

B. Protect the site from puddling or running water. Provide water barriers as required to protect the site from soil erosion.

1.20 DUST CONTROL

A. Execute the Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into the atmosphere.

1.21 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize the amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct the fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect the earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.22 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by the construction operations.

B. Restrictions on Noise:
1. Use equipment with well-maintained mufflers.
2. Use the least noisy techniques practical.
3. Schedule noisy activities when ambient background noise level is highest.
4. Turn off all unneeded and idling equipment and engines.
5. Locate noise sources as far as practical from noise sensitive locations.
6. Orient noise sources away from noise sensitive locations

1.23 PEST CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work, or entering the facility.

1.24 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent the contamination of soil, water, and the atmosphere from discharge of noxious, toxic substances, and pollutants produced by the construction operations.

1.25 RODENT CONTROL

A. Provide methods, means, and facilities to prevent rodents from accessing or invading the premises.

1.26 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion.

B. Remove the underground installations to a minimum depth of 2 feet. Grade the site as indicated.

C. Clean and repair the damage caused by installation or use of temporary work.

D. Restore the existing facilities used during construction to the original condition. Restore the permanent facilities used during construction to the specified condition.

PART-2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

1.02 PRODUCTS

A. Products: Means new material, machinery, components, fixtures, or systems forming the Work; but does not include the machinery or equipment used for the preparation, fabrication, conveying, or erection of the Work. Products may include the existing materials or components required or specified for reuse.

B. Furnish products of qualified manufacturers suitable for the intended use. Furnish products of each type by a single manufacturer unless specified otherwise.

C. Do not use materials and equipment removed from the existing premises, except as specifically permitted by the Contract Documents.

D. Furnish interchangeable components of the same manufacturer for the components being replaced.

1.03 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with the manufacturer's instructions.

B. Promptly inspect shipments to ensure that the products comply with the requirements, the quantities are correct, and the products are undamaged.

C. Provide equipment and personnel to handle the products by methods to prevent soiling, disfigurement, or damage.

1.04 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect the products in accordance with the manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to the product.

D. For exterior storage of fabricated products, place on sloped supports above the ground.

E. Provide bonded off-site storage and protection when the site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent the condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store the products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of the products to permit access for inspection. Periodically inspect to verify that the products are undamaged and are maintained in acceptable condition.

1.05 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only:
Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions:
Submit a request for substitution for any manufacturer not named in accordance with the following article.

C. Products Specified by Naming Three or More Manufacturers with No Substitutions:
Products of one of the manufacturers listed and meeting the specifications, no options or substitutions allowed.

1.06 PRODUCT SUBSTITUTION PROCEDURES

A. Throughout these Specifications, types of materials may be specified by manufacturer's name, and product information in order to establish standards of quality and performance and not for the purpose of limiting competition.

B. Inclusion of additional names of manufacturers, other than the Basis of Design manufacturer, does not imply acceptability of standard products from those manufacturers listed. All manufacturers listed shall conform, with modification as necessary, to criteria established by the specification for performance, efficiency, materials, finishes and special accessories along with, at a minimum, matching the Basis of Design product.

C. No substitutions will be considered prior to receipt of Bids unless written request for approval (by hard copy or email) has been received by the Architect at least 10 calendar days prior to the Bid due

date. If the product substitution is approved prior to receipt of the Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals announced in any other manner.

It will be the Architect's and Owner's option to consider a formal request, review and acceptance of a product substitution following award of the contract. For all requests made after award of the contract, the Architect will review the requests with reasonable promptness and notify the Contractor in writing of the decision to accept or reject the substitution.

D. A request for substitution of any manufacturer or product not named in a specification section is to be submitted in accordance with the following.
   1. Document each request with complete data substantiating the compliance of a proposed Substitution with the Contract Documents.
   2. A request constitutes a representation that the Contractor:
      a. Has investigated the proposed product and determined that it is equal to or superior in all respects to the specified product.
      b. Will provide the same warranty for the substitution as for the specified product.
      c. Will coordinate the installation and make changes to other Work that may be required for the Work to be complete with no additional cost to the Owner.
      d. Waives claims for additional costs or time extension that may subsequently become apparent.
      e. Will coordinate installation with all affected trade Contractors, specialty Contractors and the like and will be responsible for any and all costs which may arise as a result of this substitution.
      f. Will reimburse the Owner and the Architect for review or redesign services associated with re-approval by the authorities having jurisdiction.

E. Substitutions will not be reviewed when a substitution is implied on the Shop Drawing or Product Data submittals without a separate written request or when acceptance will require revision to the Contract Documents.

F. If the Contractor proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the Contractor shall inform the Architect in writing of the nature of such deviations at the time the material is submitted for review.

G. Substitution Submittal Procedure:
   1. Submit the Request for Substitution letter, Shop Drawings, Product Data, direct comparison table and the certified test results attesting to the proposed product equivalence by E-mail via an electronic format (PDF) copy to the Architect. Assemble package into a single indexed file incorporating all the required information.
   2. The Contractor shall submit a separate request for each product substitution.
   3. Provide direct comparison between the specified product and the proposed substitution. The burden of proof is on the proposer.
      Supporting data to be submitted to permit a fair evaluation of the proposed substitution must address:
      a. Performance;
      b. Capacity;
      c. Efficiency;
      d. Safety;

e. Function;
f. Appearance;
g. Quality and durability;
h. Finish;
i. Warranty terms and conditions;
j. Directly compare, side-by side, in table format, all listed testing agency performance requirements;
k. Delivery times and effect on schedules, if any;
l. Changes in space requirements or affect on other elements of work, if any;
m. Availability of maintenance service and source of replacement materials, if applicable.

H. The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the building. The Architect shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified proposed substitutes which, in the Architect's opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes the Contractor shall, if required by the Architect, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the Owner.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Examination.

B. Preparation.

C. Field Engineering.

D. Protection of adjacent construction.

E. Cutting and patching.

F. Special procedures.

G. Progress cleaning and waste removal.

H. Final cleaning.

I. Starting and adjusting of systems.

J. Demonstration and Instructions.

K. Testing, adjusting and balancing.

L. Protecting Installed Construction.

1.02 EXAMINATION

A. Acceptance of Conditions:
1. Verify that the existing applicable site conditions, substrates, or substrate surfaces are acceptable or meet the specific requirements of the individual specifications Sections, for subsequent Work to proceed.
2. Verify that the existing substrate is capable of structural support or attachment of new Work being applied or attached.
3. Examine and verify specific conditions described in the individual specifications Sections.
4. Verify that utility services are available, of the correct characteristics, and in the correct locations.
5. Beginning of new Work, that relies upon the quality and proper execution of the Work of a preceding trade, means acceptance of that preceding Work as appropriate for the proper execution of subsequent Work.

6. Acceptance of preceding Work that can be shown later to have adversely affected proper performance of new Work may result in removal and repeat performance of all Work involved at no cost to the Owner.

1.03 PREPARATION

A. Clean substrate surfaces prior to applying the next material or substance.

B. Seal cracks or openings of the substrate prior to applying the next material or substance.

C. Apply a manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

D. Prior to the application, installation, or erection of any products and product components, perform any other preparatory operations, or surface or substrate modifications, as may be specified or directed by the product manufacturers.

1.04 FIELD ENGINEERING

A. Employ a Land Surveyor registered in the State of Rhode Island and acceptable to the Architect and the Owner.

B. Locate and protect the survey control and reference points. Promptly notify the Architect of any discrepancies discovered.

C. Control Datum for the survey is that established by the Owner provided survey, shown on the Drawings

D. Verify setbacks and easements, if any; confirm the drawing dimensions and elevations.

E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

F. Submit a copy of the site drawings and certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

G. Maintain a complete and accurate log of the control and survey work as it progresses.

H. Protect the survey control points prior to starting the site work; preserve the permanent reference point during construction.

I. Promptly report to the Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

J. Replace the dislocated survey control point based on the original survey control. Make no changes without prior written notice to the Architect.

1.05 PROTECTION OF ADJACENT CONSTRUCTION

A. Protect the existing adjacent properties and provide special protection where specified in the individual Specification Sections.

B. Provide protective coverings at wall, projections, jambs, sills, and soffits of the existing openings.

C. Protect the existing finished floors, stairs, and other existing surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

D. Repair adjacent properties damaged by the construction operations to the original condition to the satisfaction of the Owner.

E. Prohibit unnecessary traffic from the existing landscaped areas.

F. Restore the grassed landscaped areas damaged by the construction operations to a full healthy growth by installing loam and sod.

1.06 CUTTING AND PATCHING

A. Employ the original, or skilled and experienced installer to perform cutting and patching.

B. Submit a written request in advance of the cutting or altering elements which affect:
1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of the element.
4. Visual qualities of sight-exposed elements.
5. Existing construction, or the Work of separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill, to complete the Work, and to:
1. Fit the several parts together, to integrate with the other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and non-conforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in the elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods that will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.

E. Cut masonry, concrete, and other rigid materials using a masonry saw or core drill.

F. Restore the Work with new Products in accordance with the requirements of Contract Documents.

G. Fit Work tight to the pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Maintain the integrity of the wall, ceiling, or floor construction; completely seal voids.

I. At the penetration of fire rated partition, ceiling, or floor construction completely seal the voids with a fire rated or fire resistant material to the full thickness of the penetrated element as required to equal the rating of the surrounding construction.

J. Refinish surfaces to match the adjacent finishes. For continuous surfaces refinish to nearest intersection; for an assembly refinish the entire unit.

K. Identify any hazardous substance or conditions exposed during the Work to the Architect for a decision or remedy.

1.07 SPECIAL PROCEDURES

A. Materials: As specified in the product Sections; match the existing with new products, or salvaged products as appropriate, for patching and extending work.

B. Employ a skilled and experienced installer to perform alteration work.

C. Cut, move, or remove items as necessary for access to the alterations and renovation Work. Replace and restore at completion.

D. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace the materials as specified for finished Work.

E. Remove the debris and abandoned items from the area and from concealed spaces.

F. Prepare the surface and remove surface finishes to provide the installation of new Work and finishes,

G. Close the openings in exterior surfaces to protect the existing Work from the weather and extremes of temperature and humidity.

H. Remove, cut, and patch the Work in a manner to minimize damage and to provide a means of restoring products and finishes to the original or specified condition.

I. Refinish the existing visible surfaces to remain in renovated rooms and spaces to the specified condition for each material, with a neat transition to the adjacent finishes.

J. Where new Work abuts or aligns with the existing, provide a smooth and even transition. Patch the Work to match the existing adjacent Work in texture and appearance.

K. When finished surfaces are cut so that a smooth transition with the new Work is not possible, terminate the existing surface along a straight line at a natural line of division and submit a recommendation to the Architect for review.

L. Where a change of plane of 1/4 inch or more occurs, submit a recommendation for providing a smooth transition to the Architect for review.

M. Trim existing doors as necessary to clear new floor finish. Refinish the trim as required.

N. Patch or replace the portions of existing surfaces which are damaged, or showing other imperfections.

O. Finish surfaces as specified in the individual product Sections or as indicated on the Drawings.

1.08 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain the site in a clean and orderly condition.

B. Remove the debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Sweep and vacuum clean the interior areas prior to the start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove the waste materials, debris, and rubbish from the site periodically or weekly and dispose of off-site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.09 FINAL CLEANING

A. Execute final cleaning of areas affected by the Work prior to the final project assessment.

B. Clean the interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean the equipment and fixtures to a sanitary condition using cleaning materials appropriate to the surface and material being cleaned.

D. Clean or replace filters of operating equipment as directed by the Architect.

E. Clean the debris from roofs, gutters, downspouts, and drainage systems.

F. Clean the site; sweep the paved areas, rake clean the landscaped surfaces.

G. Remove the waste and surplus materials, rubbish, and the construction facilities from the site.

1.10 STARTING AND ADJUSTING OF SYSTEMS

A. Coordinate the schedule for the starting and adjusting of various equipment and systems.

B. Notify the Architect and the Owner seven days prior to the starting and adjusting of each item.

C. Verify that each piece of equipment or system has been checked for the proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify that the tests, meter readings and the specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute the starting and adjusting under the supervision of the responsible Contractor's personnel or manufacturer's representative, in accordance with the manufacturer's instructions.

G. Adjust the operating Products and equipment to ensure smooth and unhindered operation.

H. When specified in the individual specifications Section, require the manufacturer to provide the authorized representative to be present at the site to inspect, check, and approve the equipment or system installation prior to starting, and to supervise the placing of equipment or system in operation.

I. Submit a written report in accordance with Section 01 43 00 that the equipment or system has been properly installed and is functioning correctly.

1.11 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate the operation and maintenance of Products to the Owner's personnel two weeks prior to the date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform a demonstration for the other season within six months.

C. Utilize the operation and maintenance manuals as the basis for instruction. Review the manuals with the Owner's personnel in detail to explain all aspects of the operation and maintenance.

D. Demonstrate the start-up, operation, control, adjustment, trouble shooting, servicing, maintenance, and shutdown of each item of equipment at a scheduled or agreed upon time, at the equipment or system location.

E. Prepare and insert additional data in the operations and maintenance manuals when the need for additional data becomes apparent during the instruction.

1.12 TESTING, ADJUSTING, AND BALANCING

A. Submit, for the Owner's approval, the name of an independent firm to perform testing, adjusting, and balancing. The independent firm's services will be paid for by a Change Order from the testing and inspection allowance specified in Section 01 21 00.

B. The independent firm will perform the services specified in the individual specifications Sections.

C. Reports will be submitted by the independent firm to the Architect and the Owner indicating the observations and test results, indicating the compliance or non-compliance with the specified requirements and with the requirements of the Contract Documents.

1.13 PROTECTING INSTALLED CONSTRUCTION

A. Protect the installed Work and provide special protection where specified in the individual specification sections.

B. Provide temporary and removable protection for the installed products. Control activity in the immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Repair or replace the installed Work damaged by construction operations, as directed by the Architect.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 74 19

WASTE MATERIALS MANAGEMENT AND RECYCLING

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 WASTE MANAGEMENT GOALS FOR THE PROJECT

A. The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as feasible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing overall packaging and poor quantity estimating.

B. Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for reuse or recycling. Waste disposal in landfills or incinerators shall be minimized. On new construction projects this means careful recycling of job site waste, on demolition projects this also means careful removal for salvage.

1.03 SUMMARY:

A. This Section includes required salvage and recycling of the following waste materials and applies to all such listed waste materials produced during the course of this Contract:
   1. Land Clearing Debris: Solid waste generated solely from land clearing operations, such as stumps and trees.
      a. See Division 2 "Site Clearing" section for requirements for salvage and processing of designated materials to produce mulch for use in landscape construction for this project. Material required for production of landscape mulch is not classified as "land clearing debris.
   2. Concrete, Masonry, and Other Inert Fill Material: Concrete, brick, rock, clean soil not intended for other on-site use, broken up asphalt pavement containing no ABC stone, clay, concrete, or other contaminants, and other inert material.
   3. Metals: Metal scrap including iron, steel, copper, brass, and aluminum.
   4. Untreated Wood: Unpainted, untreated dimensional lumber, plywood, oriented strand board, masonite, particleboard, and wood shipping pallets.
   5. Gypsum Wallboard Scrap: Excess drywall construction materials including cuttings, other scrap, and excess materials.
   6. Cardboard: Clean, corrugated cardboard such as used for packaging, etc.
   7. Paper: Discarded office refuse such as unwanted files, correspondence, etc.
   8. Plastic Buckets: Containers for various liquid and semi-solid or viscous construction materials and compounds.
   9. Beverage Containers: Aluminum, glass, and plastic containers.
   10. Other Mixed Construction and Demolition Waste: Solid waste resulting solely from construction, remodeling, repair, or demolition operations on pavement, buildings, or other structures exclusive of waste materials listed herewith.
   11. Materials to be salvaged if possible:

a. Dimensioned Lumber and Heavy Timbers.
b. Wood siding.
c. Structural Steel.
d. Wood Paneling, molding, trim and Wainscoting.
e. Cabinets and casework.
f. Insulation.
g. Brick and block.
h. Electric Equipment and Light Fixtures.
i. Plumbing fixtures and brass.
j. Windows, doors and frames.
k. Hardwood flooring.

B. Non-Recyclable Waste: Collect and segregate non-recyclable waste for delivery to a permitted landfill site.
1. Mixed Solid Waste: Solid waste usually collected as a municipal service, exclusive of waste materials listed above.

1.04 HAZARDOUS MATERIAL SUSPICION

A. If, during the course of construction, the Contractor suspects a material to contain asbestos, all work involving the material is to be stopped and the Architect notified immediately of the suspicion. Until the material is confirmed to be safe or tested and determined to be an asbestos containing material, the Contractor is to assume it contains asbestos and is to avoid contact. Upon notification of its composition the Architect will determine the course of action and inform the Contractor accordingly.

1.05 DEFINITIONS:

A. Waste Materials are defined as large and small pieces of the materials indicated which are excess to the contract requirements and generally include materials which are to be salvaged from existing construction and items of trimmings, cuttings and damaged goods resulting from new installations, which can not be effectively used in the Work.

1.06 SUBMITTALS:

A. Show compliance with regulations specified under "Quality Assurance" article below. Include a list of recycling facilities to which indicated recyclable materials will be distributed for disposal. Identify materials that are not recyclable or otherwise conservable that must be disposed of in a landfill or other means acceptable under governing State and local regulations. List permitted landfills and/or other disposal means to be employed. Indicate any instances where compliance with requirements of this specification does not appear to be possible and request resolution from the Architect.

B. Delivery Receipts: Provide delivery receipts for waste materials salvaged and sent to permitted waste materials processors or recyclers within 48 hours of delivery that indicate the location and name of firm accepting recyclable waste materials, types of materials, net weights of each type, date of delivery and value of materials.

C. Application for Payments: The Contractor shall submit with each Application for Payment a summary of waste materials, recycled, salvaged and disposed of using a form generated by the

Contractor and approved by the Architect. Failure to submit this information shall render the Application for Payment incomplete and shall delay Payment. The Summary shall contain the following information: For each material salvaged and recycled from the Project, include the amount (in cubic yards or tons or in the case of salvaged items state quantities by number, type and size of items) and the destination (i.e. recycling facility, used building materials yard). For each material land filled or incinerated from the Project, include the amount (in cubic yards or tons) of material and the identity of the landfill, incinerator or transfer station.

1.07 QUALITY ASSURANCE:

A. Regulatory Requirements: Comply with all applicable requirements of the federal, state or local authorities concerning Management of Construction, Demolition, Land Clearing, Inert, and Yard Trash Debris

B. Disposal Sites, Recyclers, and Waste Materials Processors: Use only facilities properly permitted by the State and by local authorities where applicable.

C. Implementation: Include a discussion of waste management and recycling in worker orientation. Provide on-site instruction on appropriate separation, handling, recycling, and salvaging methods to be used by all parties at the appropriate stages of the work at the site. Include waste management and recycling discussion in pre-fabrication meetings with subcontractors and fabricators. Also include discussion of waste management and recycling in regular job meetings and job safety meetings conducted during the course of work at the site.

1.08 STORAGE AND HANDLING:

A. Site Storage: Remove all indicated recyclable materials from the work location to approved containers daily. Failure to remove waste materials will be considered cause for withholding payment and termination of Contract.

B. Position covered containers for recyclable waste materials at a designated location on the Project Site. Select a location for the recyclable materials containers separated from that of general waste and rubbish containers. Provide separate collection containers for a minimum of the following materials:
1. Untreated lumber.
2. Gypsum wallboard.
3. Paper, paper products, and cardboard.
4. Plastics.
5. Metals.
6. Glass.
7. Other salvageable materials.

C. Change out loaded containers for empty ones as demand requires, but not less than weekly.

D. Handling: Deposit all indicated recyclable materials in the containers in a clean (no mud, adhesives, solvents, petroleum contamination), debris-free condition. Do not deposit contaminated materials into the containers until such time as such materials have been cleaned.

E. If the contamination chemically combines with the material so that it can not be cleaned, do not deposit into the recycle containers. Comply disposal with all legal and regulatory requirements.

1.09 PROJECT/SITE CONDITIONS:

A. Environmental Requirements: Transport recyclable waste materials from the Work Area to the recycle containers and carefully deposit in the containers without excess noise and interference with other activities, in a manner to minimize noise and dust. Reclose container covers immediately after materials are deposited.
   1. Do not place recyclable waste materials on the ground adjacent to a container.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 WASTE MANAGEMENT:

A. General: Implement waste management procedures throughout the life of this Contract.

B. Source Separation: Separate, store, protect, and handle at the project site all identified recyclable and salvageable waste products to prevent contamination of materials and maximize recyclability and salvageability of materials.

C. Arrange for the regular collection, transport from the site, and delivery to respective approved recycling centers of indicated recyclable waste materials. Maintain records accessible to the Architect for verification of construction waste materials recycling.

D. Delivery Receipts: Arrange for timely pickups from the site or deliveries to approved recycling facilities of designated waste materials to keep construction site clear and prevent contamination of recyclable materials. Keep and maintain records of all deliveries to recycling facilities and all pickups of waste materials at the site by others as specified above.

3.02 RECYCLABLE WASTE MATERIALS HANDLING:

A. General: The following paragraphs supplement handling requirements for various materials identified for classification and recycling listed in Part 1 "Summary" article above.

B. Paper: Classify and handle waste paper goods as follows:
   1. Bond Paper: As generally found in the construction offices and used for specifications, correspondence, copiers, printers and FAX machines. Collect in a separate container at each workstation and deposit loose in the appropriate recycle container daily.
   2. Newsprint: Newspapers and tabloid style advertising. Collect in a single location and deposit daily in the appropriate recycle container.
   3. Prints (drawings): Set up a single location for collection. Roll together to minimize space. Deposit daily in the appropriate recycle container.

C. Packaging materials:
   1. Cardboard and paperboard cartons and boxes: Knock-down, fold flat and deposit in the appropriate recycle container.
   2. Paper packing materials (separators, stiffeners, etc.) shall be placed in the same container.
   3. Newsprint, used as packing (shredded or whole), shall be deposited in the recyclable container for newsprint.

4. Plastic (polystyrene peanuts and other shapes) shall be deposited in the recyclable container for plastics.
5. Metal and plastic banding materials shall be deposited in the appropriate container.

D. Metals: Cut all items to lengths and sizes to fit within the container provided, when necessary. Where there is sufficient quantity of a specific recyclable waste item (for example; salvaged metal roofing or duct work), make special arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up. Coordinate all special arrangements with the Architect.

E. Plastics: Collect recyclable plastics (polystyrene and others specifically marked for recycling) daily from work areas and deposit in designated containers.

F. Glass: Remove waste glass products (sheet, bottles, etc.) daily from the work area and deposit in designated containers. Glass containing imbedded wire (typical in some fire rated doors having glazed lights) is not recyclable.

G. Gypsum Wallboard: Separate gypsum wallboard from other wastes. Dispose of waste gypsum wallboard off-site at a gypsum reclamation or recycling facility.

H. Other Items: Where recyclability classification of any given waste material is unclear, verify with the Architect.

END OF SECTION

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SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Closeout procedures.

B. Quality assurance.

C. Maintenance service.

D. Owner's Manuals

E. Operations and maintenance manuals.

F. Materials and finishes manuals.

G. Equipment and systems manuals

H. Spare parts and maintenance materials.

I. Product warranties and product bonds.

J. Project Record documents.

K. Project close out inspections – Punch List

1.02 CLOSEOUT PROCEDURES

A. Submit a written certification that the Contract Documents have been reviewed, the Work has been inspected, and that the Work is complete in accordance with the Contract Documents and is ready for the Architect's review.

B. Provide submittals to Architect that are required by the governing or other authorities, including the following closeout documents:
1. AIA Document G706 - Contractor's Affidavit of Payment of Debts and Claims, 1994 Edition.
2. AIA Document G706A - Contractor's Affidavit of Release of Liens, 1994 Edition.
3. AIA Document G707 - Consent of Surety to Final payment, 1994 Edition.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. The Owner will occupy all portions of the building as specified in Section 01 11 00.

1.03 QUALITY ASSURANCE

A. Employ personnel assembling submittals experienced in the maintenance and the operation of the described products and systems.

1.04 MAINTENANCE SERVICE

A. Submit a contract for furnishing service and maintenance of the components indicated in the specification Sections for one year from date of Substantial Completion, or during the warranty period, whichever period of time is the longest.

B. Provide for an examination of the system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include a systematic cleaning, examination, adjustment, and lubrication of the components. Repair or replace the parts whenever required. Use the parts produced by the manufacturer of the original component.

D. Do not assign or transfer the maintenance service to an agent or Subcontractor without the prior written consent of the Owner.

1.05 OWNER'S MANUALS

A. Submit the data for Operations and Maintenance, Materials and Finishes, and Equipment and Systems Manuals bound in 8-1/2 x 11 inch text pages, in maximum 2 inch size, D side three - ring commercial quality binders with durable cleanable plastic covers.

B. Prepare binder covers with the printed title of the manual, title of the project, and the subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Drawings: Provide with reinforced punched binder tab. Bind in with the text; fold the larger drawings to the size of the text pages.

E. Submit one copy of the completed volumes for review. They will be reviewed and returned with the Architect's comments. Revise the content of the manuals as required prior to final submission.

F. Submit <u>one</u> set of revised final volumes in final form.

G. Submit one copy of all the manuals for Operations and Maintenance, Materials and Finishes, and Equipment and Systems in PDF electronic format on a Compact Disc or DVD.

1.06 OPERATIONS AND MAINTENANCE MANUALS

A. Contents: Prepare the Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:

1. Part 1: Directory, listing the names, addresses, and telephone numbers of the Architect, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by the specification Section. For each category, identify the names, addresses, and telephone numbers of the Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.
   e. MSDS for applicable products.

1.07 MATERIALS AND FINISHES MANUALS

A. Instruction for Care and Maintenance: include manufacturer's instructions for cleaning agents and methods, precautions against detrimental agents and methods, and a recommended schedule for cleaning and maintenance.

B. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

C. Include Material Safety Data Sheets (MSDS) for all applicable products. These are required to provide both workers and emergency personnel with the proper procedures for handling or working with a particular substance. MSDS's include information such as physical data (melting point, boiling point, flash point etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill/leak procedures.

D. Additional Requirements: As specified in the individual product specification Sections.

E. Include a listing in the Table of Contents for design data, with a tabbed flysheet and a space for the insertion of data.

1.08 EQUIPMENT AND SYSTEMS MANUALS

A. For equipment, or component parts of equipment put into service during construction and operated by the Owner, submit documents within 10 days after acceptance.

B. Each Item of Equipment and Each System: Include a description of the unit or system, and the component parts. Identify the function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; by label machine.

D. Include color-coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Include a servicing and lubricating schedule, and a list of lubricants required.

H. Include the manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by the controls manufacturer.

J. Include the original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Include control diagrams by the controls manufacturer as installed.

L. Include the Contractor's coordination drawings, with color-coded piping diagrams as installed.

M. Include charts of valve tag numbers, with the location and function of each valve, keyed to the flow and control diagrams.

N. Include a list of the original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

O. Include test and balancing reports as specified in Section 01 45 00.

P. Additional Requirements: As specified in the individual product specification Sections.

Q. Include a listing in the Table of Contents.

1.09 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in the quantities specified in the individual specification Sections.

B. Deliver to the Project site and place in a location as directed by the Owner; obtain a receipt prior to final payment.

1.10 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by the responsible subcontractors, suppliers, and manufacturers, within 10 days after the completion of the applicable item of work.

B. Execute and assemble the transferable warranty documents and bonds from the subcontractors, suppliers, and manufacturers.

C. Verify that the documents are in the proper form, contain full information, and are notarized.

D. Co-execute the submittals when required.

E. Submit two copies in D side three ring binders with a durable plastic cover.

F. Submit prior to the final Application for Payment.

G. Time of Submittals:
1. For equipment or component parts of equipment put into service during construction with the Owner's permission, submit the documents within 10 days after acceptance.
2. Make other submittals within 10 days after the Date of Substantial Completion, prior to the final Application for Payment.
3. For items of Work for which acceptance is delayed beyond the Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty or bond period.

1.11 PROJECT RECORD DOCUMENTS

A. Maintain on the site one set of the following record documents; record actual revisions of the Work for all trades:
1. Construction drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instructions for assembly, installation, and adjusting.

B. Ensure the entries are complete and accurate, enabling future reference by the Owner.

C. Store the record documents separate from the documents used for construction.

D. Record information concurrent with the construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product Section description of the actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Construction Record Drawings and Shop Drawings: Legibly mark each item to record the actual construction including:
   1. Measured depths of foundations in relation to the first floor datum.
   2. Measured horizontal and vertical locations of the underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in the construction.
   4. Field changes of dimension and detail.
   5. Details not on the original contract construction drawings.

G. Legibly marked Specifications, and legibly marked Record Construction Drawings and Shop Drawings shall constitute the Project Record Documents.

H. Update the on-site Project Record Documents on a regular basis. Monthly payments will not be processed if Project Record Documents are not maintained up to date.

I. At completion of the Work of the Contract, the Architect will furnish the Contractor with an electronic copy of the construction drawings in AutoCad or Autodesk Revit format, and the Project Manual content in Adobe Acrobat PDF format.

J. Transfer the information from the Project Record Documents onto the electronic documents (Drawings in AutoCad or Autodesk Revit format and the Project Manual in Adobe Acrobat PDF format copied onto a CD or DVD ROM disc). These documents will constitute the As-Built Documents.
   Deliver the As-Built Documents to the Architect on two copies of compact disc and paper. The two paper copies are to be bound and printed full size.
   Also deliver the paper Project Record Documents to the Architect.

K. The Architect will review the As-Built Documents and compare them with the Project Record Documents for accuracy, and if necessary return them to the Contractor for final correction.
   At the time of final submission of the As-Built documents, submit the final Application for Payment.

L. No review or receipt of record of As-Built Documents by the Architect or the Owner shall be interpreted as a waiver of any deviation from the Contract Documents or Shop Drawings , or in any way relieve the Contractor from responsibility to perform the Work in accordance with the Contract Documents and the Shop Drawings to the extent they are in accordance with the Contract Documents

M. At completion of the Work of the Contract submit to the Architect a summary of waste materials, recycled, salvaged and disposed of as outlined in Section 01 74 19.
   The Summary shall contain the following information:
   For each material salvaged and recycled from the Project, include the amount (in cubic yards or tons

or in the case of salvaged items state quantities by number, type and size of items) and the destination (i.e. recycling facility, used building materials yard). For each material land filled or incinerated from the Project, include the amount (in cubic yards or tons) of material and the identity of the landfill, incinerator or transfer station.

N. At completion of the Work of the Contract submit to the Architect (as outlined in Section 01 74 19) delivery receipts for waste materials salvaged and sent to permitted waste materials processors or recyclers that indicate the location and name of firm accepting recyclable waste materials, types of materials, net weights of each type, date of delivery and value of materials.

O. At completion of the Work of the Contract submit to the Architect a table indicating information pertaining to construction materials used on the project that includes the following:

Name of the material
Amount of low emissive VOC
Percentage of pre-consumer recycled content
Percentage of post consumer recycled content
Distance product was manufactured from construction site (Greater or less than 500 miles)

Also submit written documentation substantiating the information in the form of a manufacturer's cut sheet, material safety data sheet or letter from the manufacturer.

1.12 PROJECT CLOSE OUT INSPECTIONS - PUNCH LIST

A. When the work has reached such a point of completion that the building or buildings, equipment, apparatus or phase of construction or any part thereof required by the Owner for occupancy or use can be so occupied and used for the purpose intended, the Contractor, prior to notification to the Architect, shall make a preliminary inspection of the Work to insure that all requirements of the Contract have been met and the Work is substantially complete and is acceptable.
Upon such notification, the Owner or the Architect and the consulting Engineers shall make detailed inspection of the Work to insure that all requirements of the Contract have been met and the Work is complete and is acceptable.

B. Within ten (10) calendar days of notification, the Architect and the consulting Engineers will perform the inspection and a copy of the report of the inspection shall be furnished to the Contractor so that the Contractor may proceed without delay with any part of the Work found to be incomplete or defective. The Contractor shall complete the items listed within thirty (30) calendar days and notify the Owner and Architect

C. When the items appearing on the report of inspection have been completed or corrected, the contractor shall so advise the Owner and the Architect. After receipt of this notification, the Owner or the Architect and consulting Engineers shall reinspect and inform the Contractor of any remaining items.

A copy of the report of the final inspection containing all remaining contract exceptions, omissions and incompletions shall be furnished to the Contractor within seven (7) calendar days of notification.

D. The Contractor shall within fourteen (14) calendar days complete the items listed on the inspection report and provide notification of completion and all remaining contract exception, omissions and

incompletions from the Contractor, the Owner and the Architect and consulting Engineers will reinspect the Work to verify completion of the exception items appearing on the report of final inspection.

Upon completion of reinspections, the Architect will prepare a certificate of final acceptance or will furnish to the Contractor a copy of the report of the Architect's reinspection detailing Work that is incomplete or obligations that have been fulfilled but are required for final acceptance.

The Contractor shall compensate the Architect and all consulting Engineers for services performed on Punch List inspections beyond the original inspection and two reinspections of the same area through a credit change order reducing the total contract amount.

E. Upon Substantial Completion of the Work, the Contractor will be paid all retainage, less one hundred fifty percent (150%) of the value attributable to "punch list" work. As items on the punch list are completed, the Contractor will be paid one hundred fifty percent (150%) of their value at the next progress payment.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 81 13

ENVIRONMENTAL GOALS FOR THE PROJECT

PART 1 - GENERAL

1.01 ENVIRONMENTAL GOALS FOR THE PROJECT

A. Overall project goals: The Owner has established the following environmental goals for the Project. These goals are general in nature; refer to specific specification sections for more detailed requirements. Notify Owner and Architect if conflicts arise between performance of the work and environmental goals. This specification is not intended to limit alternative means of achieving these goals. Suggestions and input from the Contractor for implementing these goals are encouraged.
   1. Use resources efficiently—the construction, operation, and ultimately reuse or removal of the building should be optimized to eliminate unnecessary use of energy, water, and raw materials. As such, the building has been designed to:
      a. Require a minimum of nonrenewable energy.
      b. Require a minimum amount of water.
      c. Support occupant efforts to recycle and reuse materials.
      d. Be durable consistent with expected current and future uses.
      e. Utilize materials and construction methods that require a minimum of energy, water, and raw materials.
      f. Be reusable and/or recyclable in whole or in component parts.
   2. Provide a healthy and productive indoor environment—to the extent that the building can affect their experience, occupants should be enlivened, relaxed, and stimulated when they are in the building. To this end, the building has been designed to:
      a. Minimize the potential for water accumulation in conditions in which mold and mildew can flourish.
      b. Utilize daylight as a primary source of illumination, while minimizing glare and extreme contrast.
      c. Provide optimal amounts of clean, fresh air to occupied spaces.
      d. Release a minimum of unhealthy pollutants from building components, fixtures, and furnishings.
      e. Evacuate effectively any pollutants generated by occupant activities in the building.
      f. Provide views and experiences of nature.
      g. Provide an aural environment that is relaxing and supportive.
   3. Enhance, restore, and protect the site the insertion of the building into the site should support and enhance the natural systems on and around the affected area. To this end, the building, infrastructure, and landscaping have been designed to:
      a. Support and utilize natural water flow patterns and minimize the need for intrusive stormwater management systems.
      b. Support native plants and the habitat they create for beneficial insects, birds, and animals.
      c. Minimize the release of harmful emissions into the soil, water, and air.
   4. Enhance, restore, and protect the global environment—the building is designed to minimize releases of pollutants that affect the global environment and to avoid the need for materials that are polluting to manufacture. These measures include:
      a. Minimizing the release of carbon dioxide (CO_2) from fuels burned on site or fuels burned off site to supply electricity to the building
      b. Avoiding the release of ozone-depleting compounds, such as HCFCs from refrigerants or foam insulation materials

c. Selection of building materials that, based on an overall life-cycle assessment, are the least damaging to the environment in their extraction, processing, use, and ultimate disposal

B. Material selection and construction process goals: In support of the overall goals listed above, the following goals have been identified for the material selection and construction process. These are also general in nature and should be considered as a guideline—in the event of a conflict, any specific requirements in technical specification sections take precedence. Tradeoffs and compromises are inevitable in the pursuit of these goals, but everyone working on the project is expected to take all reasonable actions to further these goals. Notify Owner and Architect of any performance requirements that conflict unnecessarily with these goals.
   1. Use resources efficiently:
      a. Select materials that use resources efficiently.
      b. Use construction practices that achieve the most efficient use of resources and materials.
      c. Recycle or reuse job-site waste.
      d. Select recycled-content materials.
      e. Select materials that can be recycled.
   2. Avoid scarce, irreplaceable, or endangered resources:
      a. Select materials from abundant, well-managed resources.
      b. Select materials that are replaceable, renewable, or can be replenished.
      c. Select materials that minimize damage to natural habitats.
   3. Use durable materials:
      a. Select materials with the longest usable life.
      b. Select materials that can be reused.
      c. Select materials with the least burdensome maintenance requirements.
   4. Create spaces that are healthy for occupants:
      a. Select low-toxic products and materials.
      b. Select materials without toxic maintenance requirements.
      c. Specify mechanical equipment that will provide fresh air and will not trap water or pollutants.
   5. Use energy efficiently:
      a. Select materials with low embodied energy.
      b. Select materials that save energy during building operations.
      c. Select products and equipment that save energy during building operations.
   6. Use water efficiently:
      a. Use construction practices that achieve the most efficient use of water.
      b. Select water-conserving appliances and equipment.
      c. Landscape for water conservation.
      d. Capture and utilize rainwater.
   7. Select materials that generate the least amount of pollution. Consider pollution and toxins generated during harvesting, mining, manufacturing, transport, installation, use, and disposal.
   8. Protect/restore natural habitats.

1.02 ENVIRONMENTAL GOALS IMPLEMENTATION

A. Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing the Environmental Goals for the Project.

B. Distribution: The Contractor shall distribute copies of the Environmental Goals to the Job-Site Foreman, and each Subcontractor.

C. Meetings: Environmental Goals shall be discussed at the following meetings:
   1. Pre-bid meeting
   2. Pre-construction meeting
   3. Regular job-site meetings

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 81 14

ENVIRONMENTAL IMPACT OF MATERIALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to this section.

1.02 WORK INCLUDED:

A. Objectives: To obtain acceptable Indoor Air Quality (IAQ) for the completed project and minimize the environmental impacts of the construction and operation, the Contractor during the construction phase of this project shall implement the following procedures singly or in combination:
   1. Select products that minimize consumption of non-renewable resources, consume reduced amounts of energy and minimize amounts of pollution to produce, and employ recycled and/or recyclable materials. Obtain Architect's approval of all materials listed in Part 2 prior to placing the order with the manufacturer of the material.
   2. Maintain a materials log book and verification that materials used have been reviewed for environmental considerations as outlined in this section.
   3. Control sources of potential IAQ pollutants by controlled selection of materials and processes used in project construction in order to attain acceptable IAQ as defined in this section.

B. Products and processes that achieve the above objectives to the extent currently possible and practical have been selected and shown in the Contract Documents. The Contractor is responsible to maintain and support these objectives in developing means and methods for performing the work of this Contract and in proposing product substitutions and/or changes to specified processes.

1.03 RELATED WORK:

A. Division 1 sections: "Indoor Air Quality Requirements", and "Waste Materials Management and Recycling".

1.04 SUBMITTALS:

A. Submit the following in accordance with Conditions of the Contract and Division 1 specification sections.
   1. Submit as part of the Division 1 Project Closeout documents indicating for each material the VOC content, the recycled content, and the Manufacturer's Safety Data Sheet (MSDS).

1.05 QUALITY ASSURANCE:

A. As part of the Preconstruction Meeting specified in Division 1 discuss the IAQ and environmental impact compliances required by this Contract. The purpose of this agenda item is to develop a mutual understanding of the IAQ and environmental impact program requirements, and coordination of the Contractor's management of the program with the Architect.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. The following list are qualities requested to be attained to the best ability of the Contractor for each of the described materials in the pursuit to achieve a more environmentally compatible building.

B. Division 03 - Concrete:
   1. Cast-in-Place Concrete:
      a. Reinforcing steel shall maximize recycled scrap steel content.
      b. Form release agents shall be low VOC content.
      c. Liquid membrane-forming curing and sealing compound shall be low VOC content.

C. Division 05 - Metals:
   1. Structural Steel: Framing steel shall maximize the use of recycled steel.

D. Division 06 - Wood and Plastics: Wood products:
   1. Each specified solid and veneer wood species must originate from a sustainably managed forest certified by a Forest Stewardship Council (FSC) accredited certification group such as Smartwood or Scientific Certification Systems (SCS).
   2. Fiberboard used as blocking, millwork, casework substrate, underlay and door cores must be urea-formaldehyde free, and not exceed ANSI A208.1-1993 emission standard of 0.20 ppm of formaldehyde.

E. Division 07 - Thermal and Moisture Protection:
   1. Building Insulation:
      a. Insulation materials manufactured using chlorofluorocarbons (CFCs) shall not be used. (CFCs have been completely phased out of U. S. manufactured insulation products.)
      b. Extruded polystyrene insulation shall not be manufactured with chlorofluorocarbon (CFC) blowing agent and shall maximize recycled content.
      c. Fiberglass batt insulation, fiberglass board insulation, and mineral wool insulation shall maximize use of recycled material.
      d. Mineral wool fire safing insulation shall maximize recycled material.
   3. Joint Sealants:
      a. Interior sealants shall not contain: mercury, butyl rubber, neoprene, SBR (styrene butadiene rubber), or nitrile.
      b. Silicone sealants shall be low VOC content.
      c. Polyurethane sealants containing mercury shall not be used.
      d. Compressible foam joint fillers, polyester polyurethane foam impregnated with neoprene rubber or acrylic ester styrene copolymer used in this facility shall not be manufactured with CFC blowing agents.
      e. Sealants formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure) fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components shall not be used.

F. Division 08 - Doors and Windows:
   1. Glass and Glazing:

a. Sealants and glazing compounds shall be low VOC content.
b. Sealants and glazing compounds formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure), fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components will not be used.

G. Division 09 - Finishes:
1. Paint and Polychromatic Finish Coating:
a Do not use water based paints formulated with aromatic hydrocarbons (organic solvent with a benzene ring in its molecular structure), formaldehyde, halogenated solvents, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides. Water based paints shall be low VOC and shall have a flash point of 61 degrees C or greater.
b. Where it is necessary to use solvent-based paints, they shall be formulated for low VOC emissions and shall not be formulated with formaldehyde, halogenated solvents, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides, nor formulated with more than 10% aromatic hydrocarbons by weight.
c. The following shall be low VOC and not be formulated with aromatic hydrocarbons (organic solvent with a benzene ring in its molecular structure) formaldehyde, halogenated solvents, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides.
High performance water based acrylic coatings.
Pigmented acrylic sealers.
Catalyzed epoxy coatings.
High performance silicone grafted epoxy coatings.

H. Division 31 – Earthwork & 32 - Exterior Improvements:
1. Site Clearing: Topsoil shall be provided by the Contractor from on-site material which has been stockpiled for re-use. Off-site borrow should only be used when on-site sources are exhausted.
2. Aggregate Base Course: Aggregate base course for on-site paved areas shall maximize use of recycled ABC.
3. Asphaltic Concrete Paving: Asphalt paving shall maximize use of recycled asphalt paving.
4. Site Potable Water Lines; No solder will be used with lead content.
5. Landscaping:
a. All wood fiber or cellulose hydromulch shall be 100% recovered content.
b. All herbicides must be EPA approved and applied per manufacturer's instructions. All herbicide use must be approved by the Architect.

PART 3 - EXECUTION

3.01 GENERAL:

A. Submit to the Architect for review and approval product data such as MSDS and environmental impact data prior to ordering project materials.
B. Prepare and maintain a Materials Log, providing information on content of materials, where specific materials are to be used, MSDS, and environmental specifications of the material. Maintain the log book weekly as materials are ordered.

3.02 FIELD QUALITY CONTROL:

A. The Owner reserves the right to take samples and perform, at random, tests of approved materials delivered to the job site to verify compliance of actual materials with specifications.

END OF SECTION

SECTION 01 81 22

INDOOR AIR QUALITY MANAGEMENT DURING CONSTRUCTION

PART 1- GENERAL

1.01 SUMMARY

A. IAQ Management during Construction
1. Minimize exposure of construction workers to air pollutants;
2. Prevent air pollutants from collecting in building systems and on building materials; and
3. Prevent air pollutants caused by construction from migrating into occupied spaces.

B. For the purposes of this plan, air pollutants are defined as: Particulates, Volatile organic compounds, Formaldehyde, Combustion emissions, Airborne bacteria and micro-organisms and Airborne inorganic compounds, such as ozone (from electric motors), metal fumes (from smoldering and welding), and ammonia and chlorine (from cleaning products).

PART 2- PRODUCTS

Not used

PART 3-EXECUTION

3.01 COVERING OR SEALING SOURCES OF POLLUTION

A. The following are rules that apply to materials that emit air pollution or odors:
1. Containers containing wet materials will be covered whenever they are not in active use.
2. Waste materials will be covered or sealed and regularly removed from the building.
3. Absorptive materials or materials with an odor will be covered while moved through the building.
4. Whenever possible, material containers will be disposed of with the covers on.
5. Materials that require a surface coating to control pollutants or odors will be coated promptly.

3.02 CONTROLLING POLLUTION AT ENTRANCES

A. Measures will be taken to prevent pollutants from being tracked into interior spaces by workers or equipment. These will include temporary walk-off mats and floor protection.

3.03 PROTECTION OF STORED MATERIALS

A. Measures will be taken to minimize dust accumulation on material surfaces and the absorption of other pollutants by absorbent materials. The measures will include the following:
1. Materials will be handled and stored according to the manufacturer's recommendations.
2. Unwrapped absorbent materials will be shrink-wrapped if necessary.
3. Highly absorbent materials like duct liner, acoustic tile, carpeting, or insulation will be stored indoors in the original packaging, or covered and sealed.
4. Moderately porous materials like gypsum board will be stored indoors, wrapped or away

from dust and materials prone to off-gas VOC's.

5. Framing lumber will be stored indoors whenever possible. If stored outdoors, the lumber will be covered with a water proof covering, stored off the ground, and located away from standing water.
6. Dense material like glass, metal framing, ductwork and equipment will be covered and kept dry.
7. If condensation forms on cold material, care will be taken not to expose it to dust or other particles. If exposed to pollution, housekeeping measures will be used promptly to clean the material before installation.

3.04 PREVENTING CONTAMINATION OF COMPLETED AREAS FROM WORK UNDER CONSTRUCTION

A. When work is completed in an area, the area will be protected from pollutants generated in other parts of the building still under construction. One or more of the following methods of pathway interruption will be used:
   1. Erecting barriers between completed areas and areas still under construction
   2. Where present, doors and windows will be closed and locked between completed portions of the building and portions of the building still under construction.

3.05 HOUSEKEEPING

A. The following housekeeping measures will be employed throughout construction:
   1. A regular housekeeping schedule will be instituted. Cleaning measures and frequency will be selected according to the pollutants generated in a space.
   2. Low-odor cleaning agents will be used.
   3. Spills of water or solvent will be cleaned up immediately.
   4. Attention will be given to cleaning hidden or hard-to-reach surfaces, such as wall cavities, tops of door, ledges, and behind water closets.

END OF SECTION

SECTION 02 41 16

BUILDING DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This Section includes the demolition and removal of existing buildings, utilities and other structures or debris as indicated in these documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

1. Section 01 50 00-Construction Facilities and Temporary Controls
2. Section 01 70 00 - Removals, Cutting and Patching
3. 31 10 00 Site Clearing
4. 31 23 00 Excavation and Embankment
5. 31 23 16.16 Structure Excavation and Backfill
6. 31 23 33 Trenching and Backfilling
7. 31 23 34 Trimming and Fine Grading
8. 31 25 00 Perimeter Erosion Controls
9. 31 25 24 Structural Measures for Erosion and Sedimentation Control
10. 31 25 25 Temporary Dewatering Basins
11. 31 25 24.10 Storm Drain Protection
12. 31 25 34 Stilling Basins for Water Pollution Control
13. 31 26 00 Construction Access
14. 31 27 00 Maintenance and Cleaning of Erosion and Pollution
15. 32 12 00 Dense Graded Hot Mix Asphalt Pavements
16. 32 12 10 Cleaning and Sweeping Pavement
17. 32 12 20 Cutting and Matching Pavement
18. 32 13 13 Portland Cement Concrete Pavement and Base
19. 32 90 00 Planting

1.03 SUBMITTALS

A. Quality Control Submittals:
   1. Permits: Submit one copy of each permit.
   2. Demolition Plan: For information only, submit one copy of the demolition plan.

B. Provide written proof from the Town, City and/or utility companies that all public and private services and utilities have been properly sealed off and that the Contractor has complied with all State and Local Health Laws before proceeding with the demolition.

1.04 QUALITY ASSURANCE

A. Permits: Before the Work of this Section is started, obtain all permits required by Federal, State, and local jurisdictions for all phases and operations of the Work.

B. Demolition Plan: Before the Work of this Section is started, prepare a detailed demolition plan. The demolition plan shall include, but not be limited to, detailed outline of intended demolition and disposal procedures. The demolition plan will not relieve the Contractor of complete responsibility for the successful performance of the Work in accordance with all applicable Federal, State, and local codes and restrictions.

1.05 PROJECT CONDITIONS

A. Existing Paint: Assume existing painted surfaces to contain lead based paints. Take precautions as required to prevent spread of lead containing particles and dust.

B. Recycle demolition debris to the greatest extent possible.

C. Burning is prohibited.

D. The use of explosives is prohibited.

I. Verify the location and status of all utilities within the Project Limit Line (PLL).

H. Protect utilities during the Work of this Section.

J. Disconnect the following utilities as occurring:
1. Sewer: Plug or grout inside of nearest manhole. Remove abandoned lateral from the building to a point 5 feet from the building line.
2. Water: Cut and plug at nearest main. Install thrust blocks at caps and plugs.
3. Gas: Comply with utility regulations.
4. Electric: Comply with National Electric Code and utility regulations.
5. Telephone: Comply with utility regulations.

K. Remove fluorescent lighting fixtures containing ballasts with PCB's and as indicated or specified elsewhere. Dispose of ballasts containing PCB's in compliance with all applicable rules and regulations.

L. Prior to beginning demolition, verify that all utilities serving the building to be demolished have been disconnected.

M. Do not interrupt utility services to buildings which are to remain.

N. Employ watchpersons to patrol the site 24 hours per day, 7 days a week, from the time demolition is started until rough grading is completed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plugs, Caps, Flanges: Approved cast iron thread plugs, welded caps, or flanges.

B. Grout: ASTM C 476.

C. Thrust Blocks: Minimum 2500 psi concrete.

D. Fill Within Building Foundation: Earth, sand, gravel, broken brick and masonry with a maximum size of one cubic foot. Combustible materials, metal glass, or other debris are not acceptable.

E. Selected Fill: As specified in Division31.

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide temporary 6 foot high chain link fence, including all required gates, around the building prior to start of the Work of this Section. Locate temporary fence where directed. Remove temporary fence in its entirety, including all anchorage materials, after completion of backfill operations.

B. Vermin Control: Employ a "Certified Commercial Applicator", certified by the State, to exterminate rodents and vermin in the building to be demolished.

C. Search each building. Locate drums or containers of hazardous wastes. Notify Architect if any is found.

D. Remove loose equipment, materials, supplies, and furnishings (desks, chairs, beds, mattresses, furniture, etc.) from building prior to demolition.

E. Remove items scheduled to be salvaged and place in designated storage area.

F. Items of salvageable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the site as they are removed. Storage or sale of removed items on the site will not be permitted.

G. Pump out standing water from basement and crawl space areas of the building prior to demolition. Remove all mechanical equipment, piping, etc. prior to demolition.

H. The Owner will pump out cesspools, septic tanks, and fuel tanks and remove contents from site if found.

I. Protect from damage any adjacent buildings, structures and vegetation scheduled to remain.

3.02 DEMOLITION

A. Perform demolition in a systematic manner, beginning at the top of the structure and proceeding to lowest floor. Complete demolition above each floor level before disturbing supporting members on lower levels.

B. Wet down masonry and plaster materials during demolition to prevent spread of dust and dirt. Sprinkle debris, and use temporary enclosures as necessary to limit dust to lowest practicable level. Do not use water to extent causing flooding, contaminated runoff, or icing.

C. Do not place demolition equipment in buildings where it will create excessive loads on supporting walls, floors, and frames. Promptly remove accumulated debris and materials.

D. Lower structural framing members to ground by hoist or crane.

E. Remove on-grade slabs.

F. Break lowest floor slabs to less than 3 feet in any dimension.

G. Remove interior walls level to lowest floor slab.

H. Remove exterior foundation walls.

I. Remove below grade combustible material, glass and metal.

J. Remove walks, roads, pavements, curbs, slabs on grade, and fences within project limit line unless shown or directed otherwise.

3.03 DISPOSAL

A. Remove demolition debris from property as soon as practicable.

B. Do not store, sell, or burn materials on property.

3.04 BACKFILLING AND GRADING

A. Place fill in basements and other voids within the project limit line. Where broken concrete and masonry materials are used for backfill, place fill in layers not exceeding 12 inches and compact each layer. Broken concrete and masonry shall not be used as fill material outside the limits defined by the original building foundation walls.

B. Final 12 inches of backfill below topsoil elevations shall be selected fill.

C. Rough grade surface to adjacent contours and slope to drain.

END OF SECTION

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.02 SECTION INCLUDES

A. All material, labor and equipment required for demolition and removal of existing structures and items as shown on the drawings and as may be required to permit the proper installation of any new work.

1.03 QUALITY ASSURANCE

A. Perform work in accordance with all applicable local and state Codes.

1.04 SEQUENCING

A. Coordinate with the occupancy of the owner under provisions of Section 01 10 00.

B. Avoid interference with the use of and passage to and from adjacent buildings and facilities.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 PREPARATION

A. Inspection

1. The contractor shall inspect the entire site, premises and all objects designated to be removed and those to be preserved.
2. Locate all existing utility lines and determine the requirements for their protection or abandonment.

B. Notification

1. Notify the owner at least two full working days prior to commencing the work of this section.

C. Verification

1. Prior to commencing the work of this section, verify with the owner and the Architect all objects to be removed and all objects to be preserved.

D. Protection

1. Protect all objects and utilities designated to remain as required. Active utilities shall not be interrupted.
2. Provide shoring and bracing for the support of existing structures, that are to remain in place, where necessary to prevent collapse of structures.
3. Dust control shall be as necessary to prevent the spread of dust and flying particles of during performance of the work of this section. Provide taped fire resistant polyethylene dust barriers as required. Thoroughly moisten all surfaces as required.
4. The contractor shall be responsible to repair or replace all items designated to remain that are damaged due the surrounding demolition.

3.02 CLEANING

A. Clean work under provisions of Section 01 70 00.

B. Remove all debris and trash from the site on a daily basis and dispose of in accordance with all local and state Codes.

C. All removed items scheduled to be retained shall be given to the owner for their use.

D. Burning at the site will not be permitted.

3.03 SCHEDULE

A. Site Work

1. Remove all concrete equipment pads, sidewalks and bituminous paving indicated on the plans or as required by new construction. Remove all foundations and structures indicated to be removed.
2. Sawcut pavement where existing pavement is to butt against new pavement.
3. Assume that all concrete work is reinforced. Cut or burn reinforcing flush with concrete scheduled to remain.
4. Prior to starting site work, locate, disconnect and cap all utility services designated to be removed. Locate and protect all utility services designated to remain. All work shall be performed in accordance with the requirements of the utility company or agency involved.

B. Finishes

1. Remove all finishes as indicated on the drawings and as required by new construction. Repair or replace substrate damaged by removals.

C. Roofing

1. Remove roofing materials, flashing, skylights, mechanical units and other equipment as indicated on the drawings and in the project manual.
2. Provide temporary weather protection at all portions that are open to the weather.
3. Coordinate roofing demolition with the new roofing specification.

END OF SECTION

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SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.
3. Slabs-on-grade.

B. Related Sections include the following:

1. Division 31 Section "Earthwork" for drainage fill under slabs-on-grade.
2. Division 32 Section "Portland Cement Concrete Pavement and Base" for concrete pavement and walks.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

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

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar

arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Qualification Data: For Installer and manufacturer.

E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates.Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

F. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Steel reinforcement and accessories.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor retarders.
9. Semirigid joint filler.
10. Joint-filler strips.
11. Repair materials.

G. Field quality-control testand inspection reports.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency,acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

E. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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

2.2 FORM-FACING MATERIALS

A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

B. 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.

C. 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 exposed concrete surface.

2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60.

B. Plain-Steel Wire: ASTM A 82.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar support contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, TypeI/II.

B. Normal-Weight Aggregates: ASTM C 33. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94Mand potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M.
5. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Plastic Vapor Retarder: ASTM E 1745, Class Cor polyethylene sheet, ASTM D 4397,not less than 10 mils.Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

a. Fortifiber Corporation; Moistop Plus.
b. Raven Industries Inc.; Dura Skrim 6.
c. Reef Industries, Inc.; Griffolyn Type-65.
d. Stego Industries, LLC; Stego Wrap, 10 mils.

D. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

2.7 CURING MATERIALS

A. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. AvailableProducts:

a. Burke by Edoco; Cureseal 1315 WB.
b. ChemMasters; Polyseal WB.
c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315 WB.
d. Euclid Chemical Company (The); Super Diamond Clear VOX.
e. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
f. Lambert Corporation; UV Safe Seal.
g. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
h. Meadows, W. R., Inc.; Vocomp-30.
i. Metalcrete Industries; Metcure 30.
j. Symons Corporation, a Dayton Superior Company; Cure & Seal 31 Percent E.
k. Tamms Industries, Inc.; LusterSeal WB 300.
l. Unitex; Hydro Seal 25.
m. US Mix Products Company; US Spec Radiance UV-25.
n. Vexcon Chemicals, Inc.; VexconStarseal 1315.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) 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 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 (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than4100 psi (29 MPa)at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) 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 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 (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa)at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Limit water-soluble, chloride-ion content in hardened concrete to 0.06percent by weight of cement.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducingadmixture in all 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.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Exterior Concrete

1. Minimum Compressive Strength: 4,000 psi (27.6 MPa)at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: 5-1/2percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.

B. Interior Concrete

1. Minimum Compressive Strength:4,000 psi (27.6 MPa)at 28 days.
2. Minimum Cementitious Materials Content: 564lb/cu. yd. (335 kg/cu. m).
3. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).
4. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

2.12 FABRICATING REINFORCEMENT

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

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

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

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, brace, and maintain formwork, according to ACI 301, to support lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm)for smooth-formed finished surfaces.
2. Class B, 1/4 inch (6 mm)for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

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.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

I. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

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. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

B. Granular Course: Compact granular fill with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal 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 indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into

preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. 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.

3.7 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finishandto be covered with fluid-applied or sheet waterproofing.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten 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 exposed to view orto be covered with resilient flooring, carpet, ceramic or quarry tile, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:

   a. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.

3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 3/16 inch (4.8 mm).

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.8 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 the Work.

B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..

3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. 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 semi rigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one partportland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) 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 (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) 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 Architect.

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 (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen

concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

a. Cast and laboratory cure fivestandard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one laboratory-cured specimen at 7 days, one specimen at 14 days, and three specimens at 28 days.

   a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
10. Test results shall be reported in writing to Architect, Structural 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 mixture proportions and materials, compressive breaking strength, and type of break for all 7-, 14-, and 28-day tests.

END OF SECTION 03 30 00

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SECTION 03 35 49

CONCRETE FLOOR SEALER

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.2 SECTION INCLUDES

A. Liquid concrete floor sealers.

1.3 RELATED REQUIREMENTS

A. Section 03 30 00 – Cast-in-Place Concrete.

1.4 SUBMITTALS

A. Comply with Section 01 33 00 – Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including surface preparation and application instructions.

C. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

D. Warranty Documentation: Submit manufacturer's warranties.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer regularly engaged, for past 5 years, in manufacture of liquid concrete floor sealers of similar type to that specified.

B. Applicator's Qualifications:
1. Applicator regularly engaged, for past 5 years, with documented experience in application of liquid concrete floor sealers of similar type to that specified.
2. Employ persons certifiably trained for application of liquid concrete floor sealers.
3. Approved by sealer manufacturer.

C. Site Test Application: If requested by the Architect, provide a construction site test application of liquid concrete floor sealers for evaluation of surface preparation techniques and application workmanship.
1. Construction site test application using same materials proposed for use in the Work.
2. Construction site test application at locations determined by Architect.
3. Do not proceed until workmanship of site test application is approved by Architect.

4. Approved Site Test Application: Standard for workmanship of liquid concrete floor sealers.

D. Preinstallation Meeting:
1. Convene preinstallation meeting 2 weeks before start of application of liquid concrete floor sealers.
2. Require attendance of parties directly affecting work of this section, including Contractor, Architect, applicator, and manufacturer's representative.
3. Review surface preparation, mixing, application, protection, and coordination with other work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
2. Keep materials in manufacturer's original, unopened containers and packaging until application.
3. Store liquid concrete floor sealers between 50 and 80 degrees F.
4. Store materials in clean, dry area indoors, out of direct sunlight.
5. Protect materials from freezing.
6. Protect materials during storage, handling, and application to prevent contamination or damage.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Substrate and Ambient Temperatures: Apply liquid concrete floor sealers at substrate and ambient temperatures between 50 and 90 degrees F.

B. Do not apply liquid concrete floor sealers in direct sunlight.

1.8 WARRANTY

A. Manufacturer's Warranty: Standard manufacturer's warranty with a minimum of one year.

B. Submit under the provisions of Section 01 78 00.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Subject to compliance with requirements of this Specification Section, provide products listed herein from one of the following:
1. V-Seal Concrete Sealers and Specialty Coatings
2. Surface Coatings, Inc.
3. GhostShield

B. Basis of Design: V-Seal Concrete Sealers and Specialty Coatings
   1. V-Seal 101
   2. V-Seal Phase II

2.2 MATERIALS

A. V-Seal 101 curing/sealer manufactured by V-Seal (for smooth interior concrete slab finish)
   1. Description: Reactive penetrating cure and sealer.
   2. Color: Clear

B. V-Seal Phase II sealer manufactured by V-Seal
   1. Description: Penetrating sealer.
   2. Color: Clear

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine concrete surfaces to receive liquid concrete floor sealers.

B. Notify Architect of conditions that would adversely affect application.

C. Do not begin surface preparation or application until unacceptable conditions are corrected.

3.2 PREPARATION

A. Protection of In-Place Conditions: Protect adjacent surfaces, glass, aluminum, steel, and vegetation from contact with liquid concrete floor sealers.

B. Surface Preparation of Concrete:
   1. Prepare surfaces in accordance with sealer manufacturer's instructions.
   2. Clean concrete surfaces of dirt, dust, debris, oil, grease, bond-breaker compounds, curing compounds, sealers, laitance, paint, and other contaminants which could adversely affect liquid concrete floor sealer penetration.

3.3 MIXING

A. Mix materials in accordance with manufacturer's instructions.

3.4 APPLICATION

A. For curing new concrete apply one coat V-SEAL 101 after all bleed water is gone, finishing is complete and the concrete will withstand the weight of a person and not be marred. Always test porosity prior to application. Surface must be porous and free of loose debris, mildew, topical oil, paint or other surface coatings. Surface should be dry (no standing water). Apply uniformly with roller or low pressure sprayer. Actual application rate based upon substrate porosity and absorption. Product should create a slightly white surface sheen and absorb within 1 minute without puddles. Puddles should be immediately dispersed as excessive application may result in white residue which will not affect sealer performance and generally dissipates over time or power washing.

B. Apply one coat of V-SEAL Phase II to substrates previously cured/sealed with V-SEAL 101 minimum of 7 days following 101 application. Always test small area for porosity. All surfaces to be treated must be clean and sound. Remove all membrane forming oil, grease, dirt and other contaminants. Apply Phase II to point of rejection by roller. Work-in to a manageable area with a mechanical scrubber. Thoroughly remove excess material to avoid chalk residue. Ponded or puddled material should be squeegeed, brushed, or removed, otherwise white residue may appear on the surface. If white residue starts to appear on the surface during drying, immediately remove with hot water and scrubbing. Surfaces may be slippery during application.

3.5 CLEANING

A. Clean under provisions of Section 01 70 00.

B. Wash application materials with warm water.

3.6 PROTECTION

A. Do not permit traffic on floor for a minimum period of 24 hours.

B. Protect sealed concrete floor from damage during construction.

END OF SECTION

SECTION 04 01 20

MASONRY AND STONE CLEANING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Chemical cleaner used for cleaning masonry and stone finishes in areas noted on the drawings.

1.02 SUBMITTALS

A. Submit product data and Material Safety Data Sheet under provisions of Section 01 33 00.

1.03 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

B. Masonry contractor applicator: Company specializing in applying the products specified in this section with minimum of five years documented experience approved by the manufacturer.

1.04 FIELD SAMPLES

A. Provide field sample on the existing building as required to demonstrate the effectiveness of each chemical. The Architect shall inspect for approval.

B. Test a minimum 4 ft. by 4 ft. area on each type of masonry and stone. Use manufacturer's application instructions. Let the test panel dry 3 to 7 days before inspection. Keep test panels available for comparison throughout the cleaning project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. Store in a cool, dry area with adequate ventilation. Always seal container after dispensing. Do not alter or mix with other chemicals. Maintain temperature of 45-100°F. Dispose of unused product and container in accordance with local, state and federal regulations.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Cleaning when temperatures are below freezing or will be overnight may harm masonry. Best cleaning temperatures are 40°F or above for air and masonry. If freezing conditions have existed, let the masonry thaw before cleaning.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Sure Klean Light Duty Restoration Cleaner manufactured by PROSOCO, Inc.

B. Substitutions under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.01 PROTECTION

A. Protect people, vehicles, property, plants, metal, and all nonmasonry and acid-sensitive surfaces from contact with cleaner, rinse residue, fumes and wind drift. Protect/divert auto and foot traffic. Clean when traffic is at a minimum.

B. Protect metal fixtures, light fixtures and other non-masonry items with Sure Klean® Strippable Masking or polyethylene before application. Maintain sufficient ventilation to avoid buildup of potentially damaging fumes. All caulking and sealant materials should be in place and thoroughly cured before cleaning.

C. Avoid exposing building occupants to fumes.

3.02 APPLICATION

A. Use Light Duty Restoration Cleaner on all surfaces indicated on the drawings and in strict accordance with manufacturer's instructions.

B. Before applying, read “Preparation” and “Safety Information” sections in the Manufacturer’s Product Data Sheet for Light Duty Restoration Cleaner.
Do not dilute or alter.
1. After protecting all non-masonry/concrete/stone surfaces, thoroughly pre-wet the area to be cleaned with fresh clean water working from bottom to top.
2. Apply gelled-fluid cleaner using an acid-resistant brush or heavy nap roller. Do not atomize.
3. Let cleaner dwell for 5 to 15 minutes. Scrub entire surface to work in cleaner using a nonabrasive brush or synthetic scrubbing pad. Scrub more thoroughly to remove tough stains.
Don’t let cleaner dry on the surface. If drying occurs, lightly wet treated surfaces with fresh water. Reapply the cleaner in a gentle scrubbing manner.
4. Working from bottom to top, rinse thoroughly with clean water. The best combination of rinsing pressure and water volume is provided by masonry washing equipment generating 400-600 psi with a water flow rate of 6 gallons per minute delivered through a 15-45 degree fan spray tip. Equipment should be adjustable to reduce water flow rate and rinsing pressure as required for controlled cleaning of more sensitive surfaces. See also “Equipment” section of the Manufacturer’s Product Data Sheet.
Rinsing pressures greater than 600 psi and fan spray tips smaller than 15° may permanently damage sensitive masonry. Water flow-rates less than 6 gallons per minute

may reduce cleaning productivity and contribute to uneven cleaning results. Use adjustable equipment for reducing water flow-rates and rinsing pressure as needed for sensitive surfaces.

5. Repeat steps 1 through 4 above if necessary.
6. Application to surfaces exposed to direct sunlight or high winds may cause rapid drying. When possible, clean when surfaces are shaded from direct sunlight. Wet hot surfaces with fresh water immediately before applying cleaner to remove loose soiling and reduce surface temperature. Do not let cleaner dry on the surface. If drying occurs, lightly wet treated surfaces with fresh water and reapply the cleaner in a gentle scrubbing manner.

D. All surfaces inadvertently coated with the cleaner chemicals are to be immediately and thoroughly washed and cleaned as required.

3.03 MATERIAL SAFETY DATA SHEET

A. The contractor shall submit a copy of the material safety data sheet for each chemical to the Architect.

B. Multiple copies of the data sheets shall be kept on site for distribution to the public on request.

3.04 CLEANING

A. Clean under provisions of Section 01 70 00 and in accordance with manufacturer's instructions.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01 70 00.

END OF SECTION

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SECTION 06 20 10

CARPENTRY AND MILLWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.02 SECTION INCLUDES

A. All labor and materials, equipment and installation of all work required to complete the construction and installation of all work required to this trade as indicated on the drawings and as herein specified.

1.03 RELATED SECTIONS

A. Section 09 91 00 – Painting

1.04 REFERENCES

A. American Plywood Association

B. American Woodwork Institute

1.05 SUBMITTALS

A. Submit shop drawings, product data and samples under provisions of Section 01 33 00.

1.06 QUALITY ASSURANCE

A. Work shall comply with all local and state building and fire codes.

B. Material and workmanship of all woodwork shall conform to the Premium grade requirements of the AWI Quality Standards.

1.07 REGULATORY REQUIREMENTS

A. All materials are to conform to the minimum requirements of the State Building Code or as indicated in this specification, whichever is stronger or stricter.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. Protect all materials from weather. Do not store in damp or wet areas. Stack lumber and plywood, and provide air circulation within stacks.

1.09 FIELD MEASUREMENTS

A. Verify all field dimensions at the site prior to fabrication.

1.10 COORDINATION

A. Coordinate work with other trades and under provisions of Section 01 31 00.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Framing Lumber

1. Moisture content when delivered to the project shall not exceed 19 percent.
2. Wood studs, blocking, bridging, nailing pieces, shall be Douglas Fir, Coast Region construction grade "J" and "P" or Southern Pine No. 1. All structural load bearing lumber shall be of quality to provide 1200 psi units fiber stress.
3. Mark of treating company certifying type of treatment applied on fire retardant treated and pressure preservative treated lumber.

B. Plywood shall be of the types and grades listed below:
1. Exposed exterior plywood to be American Plywood Association A-C, Group 1, Exterior, in thickness as noted on the drawings. Where thickness is not indicated, plywood shall be 3/4" thick.
4. All sheathing plywood shall be in accordance with Chapter 23 of the State of Rhode Island Building Code.

C. Interior and Exterior Woodwork for Paint Finish
1. Quality: Wood shall be free from knots, pitch or sap streaks, molded and executed as detailed and noted on the drawings.
2. Species: Wood shall be clear, kiln-dried close-grained hardwood unless otherwise indicated.

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. Rough Carpentry
1. General: Carefully lay out, cut, fit and rout all framing, blocking and other items of carpentry in such a manner as to minimize shrinkage and insure stability. Perform all carpentry work required for building in work of other trades and work to the details indicated and as required by field conditions.
2. Provide fire retardant treated wood products as shown and as follows:

At exposed or semi-exposed wood in fire rated assemblies and in spaces having limited flame spreads for exposed combustibles. Where blocking is concealed in fire rated assemblies and all areas as required by code.

3. Includes: Rough carpentry shall consist of the installation of sleepers, blocking, nailers, curb nailers, studding, grounds, screeds, and such other items of rough carpentry as may be required for proper construction and to complete the work. Absence of illustration, detail or specification will not relieve the Contractor from responsibility or carrying out the work.
4. Lumber and other rough work shall be properly framed closely fitted, accurately set to the required lines and levels and rigidly secured in place.
   Nailing and spiking shall be done in a thorough manner with nails of ample size, spikes larger than 20d being used where practicable.
   Special framing or construction, not explicitly shown on drawings or specified, shall be provided as required to complete the work in the best and most workmanlike manner.
5. Pressure preservative treated lumber: All wood in direct contact with concrete, masonry, soil or gravel shall be pressure preservative treated wood, 0.40 lbs./cu.ft., ground contact grade with a 40 year warranty. Wood shall be free from large or loose knots, shakes, checks and warpage. Apply two coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber, in accordance with AWPA M4.
6. Trim
   a. Trim shall be mitered and jointing shall be tight and formed to conceal shrinkage. All mortise, tongue-and-groove and shiplap joints shall be set in neutral white caulking compound.
7. Temporary Enclosures and Protection: Temporary enclosures of doors, windows and other exterior openings shall be provided when necessary to meet conditions specified. Maintain in good repair and remove when no longer required. Door and window frames shall be protected from traffic and from mortar drippings.

B. Blocking
1. Blocking layout and size: Continuous and solid, fire retardant 3/4 inch plywood or fire retardant 2x4 or larger where additional support is required.
2. Provide blocking in addition to any indications on the drawings in locations as follows:
   a. All standing and running trim
   b. At exterior items or fixtures mounted or attached where insulating sheathing, or cement, vinyl, PVC, or wood-lapped board siding or trim is used.
3. Attach blocking as follows:
   a. At masonry: With oval head toggle bolts and washers or with epoxy tube and sleeve systems.
   b. At concrete: With expansion shield bolts.
   c. At steel: With flat head bolts/nuts or approved power actuated fasteners.

C. Construction Hardware
1. Furnish and install all bolts, nuts, expansion shields, lag screws, toggle bolts, wood screws, nails, flat cap metal nailing discs, staples, power driven anchors and other rough hardware as required.
2. Rough hardware items shall be of appropriate type and proper capacity and size as required for each specific application.

3. All fasteners used on exterior work shall be hot dip galvanized or stainless steel.
4. Concrete and masonry anchors: Where anchors are not included in concrete or masonry construction sections, anchors shall be galvanized machine screws or bolts with standard expansion-shield type concrete anchors, Phillips "Red Head" Masonry Anchors or approved equal, of sizes and types as required.
5. Fasteners used at treated wood: Fasteners meeting manufacturers approval and requirements if not listed use stainless steel.

3.02 CLEANING

A. Clean work under provisions of 01 70 00.

3.03 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01 70 00.

END OF SECTION

SECTION 06 65 10

CELLULAR (PVC) FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cellular PVC Trim Boards for corner boards, soffits, fascias, battens, door pilasters, frieze boards, rake boards, architectural millwork and door/window trim and additional items as shown on drawings.

1.02 RELATED SECTIONS

A. Section 06 05 00 – Carpentry and Millwork

1.03 REFERENCES

A. ASTM D792 - Density and Specific Gravity of Plastics by Displacement.
B. ASTM D570 - Water Absorption of Plastics.
C. ASTM D638 - Tensile Properties of Plastics.
D. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
E. ASTM D1761 - Mechanical Fasteners in Wood.
F. ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by means of a Striker Impacted by a Falling Weight.
G. ASTM D256 - Determining the Pendulum Impact Resistance of Plastics.
H. ASTM D696 - Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer.
I. ASTM D635 - Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
J. ASTM E84 - Surface Burning Characteristics of Building Materials.
K. ASTM D648 - Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
L. ASTM D3679 - Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.
B. Product Data: Submit product data, manufacturer's catalogs and SPEC-DATA product Sheet for specified products.
C. Samples: Submit three material samples representative of the texture, thickness and widths shown and specified herein.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Perform work in accordance with all federal, state and local codes and laws.
B. Allowable Tolerances:
   1. Variation in component length: -0.00 / +1.00"
   2. Variation in component width: ± 1/16"

3. Variation in component thickness: ± 1/16”
4. Variation in component edge cut: ± 2°
5. Variation in Density -0% + 10%

C. Workmanship, Finish, and Appearance:
1. Cellular PVC that is homogeneous and free of voids, holes, cracks, and foreign inclusions and other defects. Edges must be square, and top and bottom surfaces shall be flat with no convex or concave deviation.
2. Uniform surface free from cupping, warping, and twisting.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.
B. Trim materials should be stored on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product edges and corners. Store materials under a protective covering to prevent jobsite dirt and residue from collecting on the boards.

1.07 WARRANTY

A. Provide Warranty under provisions of Section 01 78 00.
B. Provide manufacturer’s 25 year warranty against defects in manufacturing that cause the products to rot, corrode, delaminate, or excessively swell from moisture.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements of this Specification Section, provide products listed herein from one of the following:
1. Azek Building Products
2. Fypon LLC
3. Versatex

B. Basis of Design: Azek Building Products

C. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. Material: Expanded rigid poly vinyl chloride material with a small-cell microstructure and density of .55 grams/cm³.
1. Finish to be manufacturer’s standard factory finish white.
2. Exposed surface texture to be Traditional (smooth).
2. Material shall have a minimum physical and performance properties specified as follows.

B. Performance and physical characteristic requirements:

PROPERTY	UNITS	VALUE	ASTM Method
PHYSICAL			
Density	g/cm3	0.55	D 792
Water Absorption	%	0.15	D 570
MECHANICAL			
Tensile Strength	psi	2256	D 638
Tensile Modulus	psi	144,000	D 638
Flexural Strength	psi	3329	D 790
Flexural Modulus	psi	144,219	D 790
Nail Hold	Lbf/in of penetration	35	D 1761
Screw Hold	Lbf/in of penetration	680	D 1761
Staple Hold	Lbf/in of penetration	180	D 1761
Gardner Impact	in-lbs	103	D5420
Charpy Impact (@23°C)	ft-lbs	4.5	D256
THERMAL			
Coefficient of Linear Expansion	in/in/°F	3.2 x 10-5	D 696
Burning Rate	in/min	No burn when flame removed	D 635
Flame Spread Index	--	20	E 84
Heat Deflection Temp 264 psi	°F	150	D 648
Oil Canning (@140°F)	°F	Passed	D 648

2.03 ACCESSORY PRODUCTS

A. Fasteners hidden from view: All types of fasteners that work well with wood will work as well or better with AZEK™.
Fasteners to be stainless steel.
Fasteners from a nail gun work well, t-head finish nails are preferred.

B. Exposed fasteners: All fasteners exposed to view are to use the FastenMaster Cortex Concealed Fastening System for PVC trim (or equal) consisting of Torx TTap drive system screws and color-matching plugs. Install in accordance with manufacturer's instructions.

C. Adhesives:
1. Bonding AZEK™ to AZEK™, solvent based adhesive systems used for rigid PVC pipe work very well. Latex adhesives provide more working time.
2. Bonding AZEK™ to Various Substrates, numerous standard construction adhesives work well. In general, contact cement, epoxy, rubber based and urethane adhesives are acceptable. Test a particular adhesive for suitability.

D. Sealants:
1. Ensure proper sealants are used as they comply with the following:
   a. Urethane, polyurethane or acrylic sealants without silicone.
   b. Latex sealants complying with ASTM C834, Type P.

c. Manufacturer approved sealants, subject to confirmation at time of construction, include:
   1) Pecora Corporation; AC-20+.
   2) Sonneborn; Sonolac.
   3) Tremco; Tremflex 834.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Manufacturers instructions: Comply with manufacturer's product catalog installation instructions and product technical bulletin instructions.
B. Cutting: Sheets and boards can be cut using standard saws and carbide blades used for wood.
C. Drilling: Drilling can be accomplished using twist drills recommended for metals.
D. Milling: Milling can be accomplished using standard milling machines of various types. Relief Angle 20° to 30°; Cutting speed to be optimized with the number of knives and feed rate.
E. Routing: Routing can be accomplished using standard carbide tipped routers used in woodworking.
F. Where two pieces of trim join at a 90 degree angle (corner boards, etc.) the trim is to be mitered at a 45 degree angle.
G. All adjoining PVC materials are to be glued together using the specified adhesive.
H. Edge Finishing: Various sanding, grinding or filing tools. Do not allow excessive frictional heat to build up.
I. Nail Location: Standard nailing patterns are recommended. You can fasten closer to the edge than with wood.
J. Linear Thermal Expansion and Contraction: When properly fastened, allow for 1/8” movement for each 18’ board. When butting boards together, glue the butt joint with PVC cement. This will eliminate any separation at the joint. The gap can be accommodated at the ends of the run.

3.02 STANDING AND RUNNING TRIM INSTALLATION

A. Install cellular PVC trim to comply with manufacturer's written instructions.

B. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths available. Do not use pieces less than 24 inches long except where necessary.
   1. Use scarf joints for end-to-end joints.
   2. Stagger end joints in adjacent and related members.
   3. Use 2 fasteners per every framing member for trim boards applications. For trimboards 12” or wider and sheets, provide additional fasteners.
   4. Fasteners must be installed no more than 2” from the end of each board.
   5. Do not rip 3/8” and 1/2” sheet product into trim pieces.
   6. Glue to a substrate and mechanically fasten.

C. Adhesives:
   1. Glue PVC trim to trim joints such as window surrounds, long fascia runs, etc. with recommended cellular PVC cement, to prevent joint separation.
   2. Secure glue joint with fastener on each side of the joint to allow adequate bonding time.
   3. Surfaces to be glued: Smooth, clean and in complete contact with each other.

D. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Plane backs of casings to provide

uniform thickness across joints, where necessary for alignment.

3.02 CLEANING

A. Clean work under provisions of Section 01 70 00.

3.03 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01 70 00.

END OF SECTION

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SECTION 07 01 40

VINYL SIDING CLEANING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Chemical cleaner used for cleaning vinyl siding and trim in areas noted on the drawings.

1.02 SUBMITTALS

A. Submit product data and Material Safety Data Sheet under provisions of Section 01 33 00.

1.03 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

B. Applicator: Company specializing in applying the products specified in this section with minimum of five years experience.

1.04 FIELD SAMPLES

A. Provide field sample on the existing building as required to demonstrate the effectiveness of the chemical. The Architect shall inspect for approval.

B. Test a minimum 4 ft. by 4 ft. area on vinyl siding. Use manufacturer's application instructions. Let the test panel dry 3 to 5 days before inspection. Keep test panels available for comparison throughout the cleaning project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. Store in a cool, dry area with adequate ventilation. Always seal container after dispensing. Do not alter or mix with other chemicals. Maintain temperature of 45-100°F. Dispose of unused product and container in accordance with local, state and federal regulations.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Cleaning when temperatures are below freezing or will be overnight may harm siding. Best cleaning temperatures are 40°F or above for air and siding. If freezing conditions have existed, let the siding thaw before cleaning.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. SIMPLE GREEN Oxy Solve Total Outdoor Pressure Washer Cleaner

B. Substitutions under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.01 PROTECTION

A. Protect people, vehicles, property, plants, and sensitive surfaces from contact with cleaner, rinse residue, fumes and wind drift. Protect/divert auto and foot traffic. Clean when traffic is at a minimum.

B. All caulking and sealant materials should be in place and thoroughly cured before cleaning.

C. Avoid exposing building occupants to fumes.

3.02 APPLICATION

A. Use cleaner on all surfaces indicated on the drawings and in strict accordance with manufacturer's instructions.

B. Before applying, read “Preparation” and “Safety Information” sections in the Manufacturer’s Product Data Sheet.

1. Drop the siphon tube into the bottle or fill the on-board "soap reservoir".
2. Switch equipment to plain water at low pressure and wet surface.
3. At low-pressure setting, apply Simple Green Oxy Solve to an area that is small enough to be rinsed before it dries.
4. Allow cleaner to dwell on surface for 3-5 minutes.
5. Rinse at high pressure, keeping the nozzle at least 2 feet from the surface and the spray perpendicular to the surface. Never spray upwards under siding.
6. For vertical surfaces, apply solution from lower to higher areas and rinse from higher to lower areas to prevent streaking.
7. After the job is done, rinse all lawn, plants, shrubs and trees contacted by the cleaner, and flush equipment with water before storage. Runoff may temporarily discolor some asphalt sealers – divert runoff or test in a small area first.

C. All surfaces inadvertently coated with the cleaner chemicals are to be immediately and thoroughly washed and cleaned as required.

3.03 MATERIAL SAFETY DATA SHEET

A. The contractor shall submit a copy of the material safety data sheet for each chemical to the Architect.

B. Multiple copies of the data sheets shall be kept on site for distribution to the public on request.

3.04 CLEANING

A. Clean under provisions of Section 01 70 00 and in accordance with manufacturer's instructions.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01 70 00.

END OF SECTION

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SECTION 07 21 13

BOARD INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Board insulation at perimeter foundation wall, and underside of floor slabs.

B. Alternate No. 1: Metal building insulation.

1.02 RELATED WORK

A. Section 07 21 16 - Fiberglass Blanket Insulation
B. Section 13 12 50 – Metal Building System

1.03 REFERENCES

A. ASTM C578 - Physical properties of Polystyrene.

1.04 SYSTEM DESCRIPTION

A. Materials of this Section shall provide a continuous thermal barrier at building enclosure elements.

1.05 SUBMITTALS

A. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

B. Sustainable Building Material Submittal:
1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
   a. Include statement indicating costs for each product having recycled content.
2. Identify each regional material along with the location of its harvest, extraction, or manufacture.

PART 2 - PRODUCTS

2.01 ACCEPTABLE INSULATION MANUFACTURERS

A. Styrofoam Brand by Dow Chemical Co.

B. Substitutions: Under provisions of Section 01 60 00.

2.02 INSULATION MATERIALS

A. Insulation for perimeter and under slab shall be Styrofoam Brand Square Edge: extruded cellular polystyrene; square edges. Shall meet ASTM C578, Type IV requirements. Compressive strength

is a minimum of 25 psi per ASTM D 1621. Thickness to be 2" with an R-Value of 10, unless noted otherwise.

B. Alternate No. 1:
Insulation for metal building roofs shall be Styrofoam Square Edge: extruded cellular polystyrene. Shall meet ASTM C578 requirements.
Thickness to be 4” with an R-Value of 20 unless noted otherwise.

C. Alternate No. 1:
Insulation for metal building walls shall be Styrofoam Square Edge: extruded cellular polystyrene. Shall meet ASTM C578 requirements.
Thickness to be 3” with an R-Value of 15 unless noted otherwise.

2.03 ADHESIVE MATERIALS

A. Adhesive: Type as recommended by insulation manufacturer.
1. Acceptable manufacturer's products:
a. ChemRex, Inc. "Contech Brands PL300 Foam Board Adhesive".
b. ChemRex, Inc. "Contech Brands Premium Foam Board Adhesive".
c. Dacar Products, Inc. "Foamgrab PS".

2.04 SPRAY FOAM INSULATION: Dow Great Stuff Pro Gaps & Cracks Insulating Foam Sealant which is a minimal-expanding, single component polyurethane foam sealant approved to be compatible with the board insulation by the manufacturer. Use to fill gaps between insulation panels and around edges of insulation panels.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify substrate and adjacent materials and insulation boards are dry and ready to receive insulation and adhesive.

B. Verify substrate surface is flat, free of fins, irregularities and materials that will impede adhesive bond.

C. Verify insulation boards are unbroken, free of damage.

3.02 INSTALLATION - FOUNDATION PERIMETER

A. Apply adhesive in 2” diameter spot applications 12” o.c. in accordance with manufacturer's recommendations.

B. Install boards on foundation perimeter, vertically. Place boards in a method to maximize contact bedding. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions.

3.03 INSTALLATION - UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Prevent insulation from being displaced or damaged while placing vapor barrier and installing concrete slab.

3.04 INSTALLATION IN METAL BUILDING

A. See Specification Section 07 21 16 and 13 12 50 for installation in metal building roof and walls.

3.05 CLEANING

A. Clean work under provisions of Section 01 70 00.

END OF SECTION

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SECTION 07 21 16

FIBERGLASS BLANKET INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.02 WORK INCLUDED

A. Fiberglass blanket insulation.

1.03 RELATED SECTIONS

A. Alternate No. 1
B. Section 07 21 13 - Board Insulation
C. Section 13 12 50 - Metal Building Systems

1.02 REFERENCES

A. FS HH-I-521 - Insulation Blankets, Thermal (Mineral Fiber, for Ambient Temperatures).

1.03 SUBMITTALS

A. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.04 REGULATORY REQUIREMENTS

A. Conform to all applicable Federal, State and local codes and laws.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements of this Specification Section, provide products listed herein from one of the following:
1. Owens Corning
2. Johns Manville
3. CertainTeed

B. Basis of Design: Owens Corning

C. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. Blanket Insulation: Must meet ASTM C-665 as noted below:

1. Blanket insulation to be formaldehyde – free and include a minimum of 20% Post Consumer material and 5% Pre-Consumer recycled material.

5. Thermal Resistance Value (R-Value)
   a. Thickness or R-Value as indicated on drawings and/or within this specification section..
   b. Minimum R-Values shall meet the minimum requirements stipulated by the State Building Code.

6. Tape: Polyester self-adhering type; 2 inches wide.

7. Per ASTM-E-84 the maximum flame-spread and smoke-developed indexes are to be 25 and 50, respectively. Must pass ASTM E 136 for combustion characteristics.

B. Metal Building Fiberglass Insulation

1. Fiberglass insulation shall be Owens Corning Certified R metal building insulation (or equal) which complies with the North American Insulation Manufacturing Association (NAIMA 202-96) specification. The fiberglass shall be faced with the material specified below, laminated to one side.

2. Facing shall be WMP-50 as manufacturered by Lamtec (or equal), composed of 0.0015" white polypropylene film exposed surface, 5 X 5 fiberglass & polyester scrim reinforcing layer, and a 0.0005" metallized polyester backing layer. The resulting facing shall have a water vapor transmission rate of 0.02 US perm (ASTM E96, Procedure A), a beach puncture of 125 scale units and a mullen burst of 100 psi. Tensile strength shall be 55 pounds in the machine direction and 50 pounds in the cross-machine direction.

3. The composite of fiberglass and facing shall have surface burning characteristics not to exceed 25 flame spread and 50 smoke developed when tested in accordance with Underwriters Laboratories 723 test method or ASTM E84 test method.

4. Metal Building insulation system.
   a. Roof
      1. Provide two layers of insulation.
         Top layer to be 4" thick (R20) extruded polystyrene board insulation as specified in section 07 21 13, and installed between thermal spacer blocks.
         The bottom layer is to be 3.7" thick (R11) fiberglass metal building insulation specified herein.

   b. Walls
      1. Provide two layers of insulation.

Exterior layer to be continuous 3" thick (R15) extruded polystyrene board insulation as specified in section 07 21 13 installed over the fiberglass insulation noted below and attached to the girts.
The interior layer is to be 4.3" thick (R13) fiberglass metal building insulation specified herein and installed vertically against the exterior of the girts.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify adjacent materials are dry and ready to receive installation.

B. Verify mechanical and electrical services within walls have been installed and tested.

3.02 INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install insulation in spaces without gaps or voids.

C. Trim insulation neatly to fit spaces.

D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.

E. Install insulation with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members. Tape seal butt ends and lapped side flanges. Tape seal tears or cuts in membrane.

3.03 CLEANING

A. Clean under provisions of Section 01 70 00.

END OF SECTION

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SECTION 07 26 16

UNDER-SLAB VAPOR BARRIER

PART 1 – GENERAL

1.01 SUMMARY

A. Products Supplied Under This Section
1. Vapor Barrier, seam tape, pipe boots, detail strip for installation under concrete slabs.

1.02 RELATED SECTIONS

A. Division 3 - Concrete Construction

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM)
1. ASTM E 1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
2. ASTM E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs
3. ASTM E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

B. American Concrete Institute (ACI)
1. ACI 302.1R Vapor Barrier Component (plastic membrane).

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Quality Control / Assurance
1. Independent laboratory test results showing compliance with ASTM & ACI Standards.
2. Manufacturer's samples, literature
3. Manufacturer's installation instructions for placement, seaming and pipe boot installation

PART 2 – PRODUCTS

2.01 MATERIALS

A. 10 mil Vapor Barrier
Performance based Specification.
1. Vapor Barrier membrane must have the following qualities

a.	Thickness of Barrier (plastic)	ACI 302.1R	Not less than 10 mils
b.	Water Vapor Barrier	ASTM E-1745	Meets or exceeds Class A
c.	Water Vapor Permeance	ASTM F 1249	0.0254 Perms
d.	Puncture Resistance	ASTM D 1709	3466 grams
e.	Tensile Strength	ASTM D 882	50.60 lbf/in

2. Acceptable 10 mil Vapor Barriers
   a. Stego Wrap (10 mil) Vapor Barrier by Stego Industries LLC
   b. Griffolyn 10-Mil Green by Reef Industries, Inc.
   c. Moistop Ultra 10 by Fortifiber Building Systems Group

2.02 ACCESSORIES

A. Seam Tape: High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 4 inches.

B. Pipe Boots: Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions around all penetrations through the vapor barrier.

C. Perimeter / edge seal: Provide double sided tack tape to seal the vapor barrier around the entire perimeter wall or footing/grade beam. Ensure the concrete is clean and dry prior to adhering tape.

PART 3 – EXECUTION

3.01 PREPARATION

A. Ensure that subsoil is approved by architect
   1. Level and tamp or roll aggregate, sand or tamped earth base.

B. Contractor shall use a screeding system that does not puncture the vapor barrier.

3.02 INSTALLATION

A. Install Vapor Barrier:
   1. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643–98.

      a. Install a vapor barrier as specified herein under all concrete slabs-on-grade and other locations as noted in the Construction Documents.
      b. Unroll Vapor Barrier with the longest dimension parallel with the direction of the pour.
      c. Lap Vapor Barrier over footings and seal to foundation walls using tack tape.
      d. Overlap joints 6 inches and seal with manufacturer's seal tape.
      e. Seal all penetrations (including pipes) with manufacturer's pipe boot.
      f. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
      g. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.

3.03 CLEANING

A. Clean under provisions of Section 01 70 00.

END OF SECTION

SECTION 07 31 13

FIBERGLASS ARCHITECTURAL ROOF SHINGLES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Granular surfaced shingle roofing.

B. Moisture shedding underlayment

C. Associated metal flashings.

1.02 RELATED SECTIONS

A. Section 02 41 19 - Selective Demolition

1.03 REFERENCES

A. ANSI/ASTM B209 - Aluminum Alloy Sheet and Plate.

B. ANSI/ASTM D226 - Roofing and waterproofing

C. ANSI/ASTM E108 - Standard Test Method for Fire Resistance.

D. ANSI/ASTM D1922 - Propagation tear resistance of plastic film and thin sheeting by pendulum method.

E. ANSI/ASTM D3018 - Standard Specification for class A Asphalt Shingles.

F. ANSI/ASTM D3161 - Standard Test Method for Wind Resistance of Asphalt Shingles (Organic or Fiberglass)

G. ANSI/ASTM D3462 - Standard Specification for Asphalt Shingles. (Fiberglass)

H. ANSI/ASTM D2822 - Asphalt Roof Cement.

I. SMACNA MANUAL - Architectural Sheet Metal Manual.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings: Indicate metal flashings, jointing methods and locations, fastening methods and locations, and installation details.

C. Product Data: Provide data indicating material characteristics, performance criteria and limitations.

D. Manufacturer's Certificate: Certify that roof shingles meet or exceed:

1. ASTM E108 Class A Fire Resistance
2. ASTM D3161 Wind Resistance
3. ASTM D1922 Tear Strength
4. ASTM D3018 Type 1
5. ASTM D3462 Standard for Asphalt Shingles. (Must have Independent certification)

E. Manufacturer's Installation Instructions

F. Samples: Submit samples indicating the full color range from the manufacturer's standard colors.

1.05 QUALITY ASSURANCE

A. Perform this work in accordance with the Asphalt Roofing Manufacturers Association Residential Asphalt Roofing Manual. Copies may be obtained at the:
Asphalt Roofing Manufacturers Assoc.

B. Maintain one copy on site at all times.

C. Manufacturer: Company specializing in manufacturing the products specified in this section with a minimum of five years of documented experience.

D. Installer: Company specializing in performing the work of this section with a minimum of five years of verifiable documented experience. Contractor must be a credentialed "Certainteed ShingleMaster Applicator."

E. Use only trained workmen skilled in the installation of this type of work. The foreman shall have a minimum of five years of verifiable documented experience.

F. Upon request furnish the name, location and contact person of previous roofing installations to the owner and the Architect.

1.06 REGULATORY REQUIREMENTS

A. Conform to Code for ASTM D3018 Class A, UL 790 Fire resistance and UL 58 Wind Uplift for shingle types specified.

B. Conform to Code for ASTM D3462 Tear resistance.

C. Conform to insurance requirements identified by owner or its representative.

D. Provide certificate of compliance from ASTM and UL indicating approval of specified products.

E. Submit evidence of applicable insurance requirements.

F. Conform to all applicable Federal, State and local codes and laws.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products under the manufacturer's recommendation and under provisions of Section 01 60 00.

B. Deliver materials in their original, unopened containers, dry, undamaged, sealed and labels intact.

C. Stand roll materials on end.

D. Store other materials flat, elevated from ground or roof deck, protected with waterproof covers as necessary to keep the materials dry.

E. Protect materials from damage. Do not use materials damaged in handling or storage. Replace damaged materials at no additional cost to the Owner.

F. When storing materials on the roof, and during application, the roofing contractor shall ensure that overloading of the deck and structure does not occur.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not install roofing materials during inclement weather.

B. Do not install ice and water protection and shingles when ambient temperature is below 50 degrees Fahrenheit.

C. Do not install roofing materials to damp or frozen deck.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during the same day.

E. Any damaged or deteriorated deck or flashing substrate which is discovered shall be promptly reported to the owner or his designated representative.

1.09 WARRANTY

A. Upon completion of the roof system and after passing a final inspection performed by the roofing manufacturer and the owners representative. The manufacturer's Warranty will be furnished for the work of this section as follows:

1. ROOF SHINGLE: 50 Year warranty

B. Warranty Extension: Manufacturer of shingle will provide a Surestart-Plus warranty with 5-Star Protection to cover labor, materials, tear-off, disposal and workmanship in the event of a materials defect during the first thirty (30) years after completion of application of shingles.

C. Provide fifteen (15) year, 110 mph wind-resistance warranty

D. Provide 15-year StreakFighter™ warranty.

E. Provide 15 year Algae Resistant warranty.

1.10 EXTRA MATERIALS

A. Furnish under provisions of Section 01 78 00.

B. Provide one bundle of shingles packaged as required for long term storage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Shingles
CertainTeed Corporation
Style: Landmark Pro AR
Color: As selected by Architect from manufacturer's standard colors.

B. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. ROOF SHINGLES
1. Roof shingle shall conform to ASTM D 3018 Type I – Self-Sealing; UL Certification of ASTM D 3462, ASTM D 3161/UL997 80 mph Wind Resistance and UL Class A Fire Resistance; glass fiber mat base; ceramically coated, colored algae resistant granules across entire face of the shingle; two-piece laminated shingle.
Minimum weight of 250 lb. per square.
Provide associated Starter Shingles.
2. Color selected by Architect from manufacturer's standard colors.

B. GABLE EDGE:
1. Aluminum, ASTM B209, pre-formed, 1 inch vertical fascia, minimum 3 inch railing on roof surface.
2. Color selected by Architect from manufacturer's standard colors.

C. SHEET MATERIALS
1. Underlayment: DiamondDeck by CertainTeed, or equal, is a synthetic polymer-based scrim-reinforced underlayment. Low-slope application minimum 2" per foot. Between slopes of 2" per foot up to 4" per foot apply two layers of DiamondDeck in "shingle-fashion" as described in the installation instructions.

2. Eave and valley protection (Ice and Water Shield): WinterGuard by CertainTeed or equal: A sheet barrier of self adhering, rubberized asphalt membrane shingle underlayment having a high traction surface and internal reinforcement. The material must have a warranty equal or greater in duration to that of the shingles being applied.

D. GUTTERS AND DOWNSPOUTS: See specification section 07 71 23.

2.03 ACCESSORIES

A. Nails: Standard round wire type, (hot dipped zinc coated steel) with a minimum 7/16 head diameter and 0.104 inch shank diameter, (minimum 7/8 inch long) or of sufficient length to penetrate through roof sheathing and into the substrate. (a minimum of 1/2 inch).

B. Plastic Cement: ASTM D2822 asphalt type with mineral fiber components, free of toxic solvents and asbestos, capable of setting within 24 hours at temperature of 75 degrees F and 50% RH. #19 cold cement manufactured by Karnak.

C. Lap Cement: Fiberated cutback asphalt type, recommended for use in application underlayment, free of toxic solvents and asbestos: #16 double coverage cement manufactured by Karnak.

2.04 FLASHING MATERIALS

A. Bituminous Paint: Acid and alkali resistant type (color black).

B. Nails: Standard round wire type, (hot dipped zinc coated steel) with a minimum 7/16 head diameter and 0.104 inch shank diameter, (minimum 7/8 inch long) or of sufficient length to penetrate through roof sheathing and into the substrate. (a minimum of 1/2 inch).

2.05 FLASHING FABRICATION

A. Form flashings to protect roofing materials from physical damage and to shed water

B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

C. Hem exposed edges of flashings minimum 1/4 inch on underside.

D. Apply bituminous paint on concealed surfaces of flashings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. A survey of existing interior building conditions shall be made by both the contractor and the owner's representative prior to the start of construction operations. All defects shall be noted, and the contractor shall prepare a list of the same in writing. Said list shall be given to the owner for his review and approval. If the contractor does not submit a list to the owner it will be assumed that there are no defects in the building and that the contractor take full responsibility for the interior of the building during the work project.

B. Any damages caused by the contractor's operations shall be repaired to the satisfaction of the owner at the contractor's expense.

C. The roofing contractor shall carefully examine the roof area in regards to dimensions, type of and quantities of existing roofing systems and type of substrate and conditions that may affect proper execution of the work. Any variations shall be reported to the owner's representative and the Architect prior to the bid. "No claims for extra costs shall be allowed because of lack of full knowledge of existing conditions".

D. Verify existing site conditions.

E. Verify that roof openings, curbs, pipes, sleeves, and vents through roof are solidly set, and wood, cant strips, wood nailing strips, and reglets are properly set and in place.

F. Beginning of roof project means installer accepts existing conditions.

3.02 PROTECTION

A. Schedule and execute all work without exposing the building interior to the effects of inclement weather. Protect the existing building, contents, and its inhabitants against all risks associated with this work.

B. Provide suitable barricades to protect the general public.

3.03 PREPARATION

A. Remove Existing roofing system completely down to existing roof deck.

B. Verify deck is clean and smooth, free of depressions, waves, or projections.

C. Fill Knot holes and surface cracks with a latex filler at areas of bonded eave protection.

D. Sweep clean deck surfaces under eave protection and underlayment.

3.04 INSTALLATION - PROTECTIVE UNDERLAYMENT

A. Place underlayment over entire roof surface and install in accordance with manufacturer’s instructions. Nail in place. No staples allowed.

B. Install protective underlayment perpendicular to slope of roof.

C. Weather lap and seal watertight with plastic cement, items projecting through mounted on roof.

3.05 INSTALLATION - EAVE ICE DAM PROTECTION

A. Place eave edge and gable edge metal flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 2 on center.

B. Apply the self adhering, rubberized asphalt membrane eave ice dam protection under No.15 roofing felt at all eaves in accordance with manufacturer's instructions.

C. Extend eave ice dam protection membrane from the eave's edge up the slope a minimum of 3 feet inside the exterior wall line of the building unless noted otherwise as a greater dimension on the drawings.

3.06 INSTALLATION - METAL FLASHINGS

A. Weather lap joints a minimum of 2 inches and seal weather tight with plastic cement.

B. Secure in place with nails at 2 inches on center. Conceal fastenings.

C. Flash and seal work projecting through or mounted on roofing with plastic cement to make weather tight.

D. Flashing metal shall be corrosion resistant.

3.07 INSTALLATION - ROOF SHINGLES

A. Install shingles in accordance with manufacturer's instructions.

B. Place shingles in straight coursing pattern with weather exposure as recommended by the manufacturer to produce double thickness over entire roof area and as required to meet the warranty. Provide double course of shingles at eaves and gables.

C. Project first course of shingles 3/4 inch beyond fascia boards.

D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.

E. Cap Hips and ridges with individual shingles, maintaining 5 inch weather exposure. Place to avoid exposed nails.

F. Install shingles using "Hurricane Nailing" of six nails per shingle.

3.09 FIELD QUALITY CONTROL

A. Field inspection by manufacturer's representative will be performed under provisions of Section 01 43 00.

B. Field inspections of the work will also be performed by the Owners designated representative and or the Architect.

C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.10 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01 70 00.

B. Do not permit traffic over finished roof surface.

END OF SECTION

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SECTION 07 71 23

GUTTERS AND DOWNSPOUTS

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.02 SECTION INCLUDES

A. Provide labor, material, and equipment necessary for furnishing a complete installation of commercial gutter system.

1.03 RELATED SECTIONS

A. Section 07 31 13 -Architectural Roof Shingles
B. Section 07 92 13 - Joint Sealants

1.04 REFERENCES

A. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

1.05 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Each type of product specified. Submit manufacturer's detailed technical product data, installation instructions and recommendations, dimensions of individual components, profiles, and finishes

C. Shop Drawings: Show fabrication and installation of commercial gutter system including fully dimensioned roof plans, expansion joint locations, sections and details of components and other related trims.

D. Finish & Color Selection: Furnish manufacturer's technical data for specified finish and color chart showing full range of colors available.

1.06 QUALITY ASSURANCE

A. Obtain all components and related accessories from one single source manufacturer.

B. Follow manufacturer's printed instructions for installing commercial gutter system. Follow primary roofing manufacturer's printed instructions for installing associated roof material for flashing gutter system to roof.

1.07 DELIVERY, STORAGE & HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. All products delivered shall be stored in a clean dry location prior to installation.

C. Products furnished with strippable protective masking shall not be exposed to direct sunlight for more than 30 minutes without removing masking.

D. Do not install finished materials with scars or abrasions.

1.08 PROJECT CONDITIONS

A. Coordinate work of this Section with adjoining work for proper sequencing to ensure protection from inclement weather and to protect materials and their finish against damage.

B. Do not install commercial gutter system during inclement weather. When installing in cold climates, warm adhesives, caulks, and primers to at least 50 degrees Fahrenheit prior to application.

PART 2 - PRODUCTS

2.02 MATERIALS

A. Gutters: Provide seamless gutters.
Manufactured in a uniform section with matching corner units, end caps, outlet tubes, and other accessories as required for a complete system.
Elevate back vertical edge at least 1 inch higher front edge.
Furnish expansion joints and expansion-joint covers fabricated from same metal as gutters.
1. Fabricate from the following exposed metal:
   a. Formed Aluminum: 0.040 inch
2. Gutter Profile: Style K according to SMACNA's "Architectural Sheet Metal Manual."
3. Gutter size: 8” width at top and 5” width at bottom.
4. Corners: Factory mitered and mechanically clinched and sealed watertight.
5. End caps to be 0.024” gauge
6. Gutter Supports: Internal concealed straps manufactured from 0.125" x 1.00" aluminum or approved hangers.
7. Gutter Accessories: Continuous snap-in leaf guard

B. Downspouts: Plain rectangular complete with machine-crimped elbows, manufactured from the following exposed metal.
1. Formed Aluminum: 3”x4” and 0.027 inch thick.
2. Finish to match gutter.
3. Downspouts to be one continuous unit without joints.
4. Outlets: At all downspout locations provide aluminum outlets to connect liner to downspout.

5. Wall Brackets: Provide wall brackets at 60" maximum spacing (minimum 2 brackets). Brackets shall be manufactured from 0.125" x 1.00" aluminum, finished to match downspout.

2.03 ACCESSORIES

A. Nails: Aluminum nails of 5056 or 6110 alloy having a minimum tensile strength of 63,000 psi. All nails shall have a suitable etch finish to remove greases and provide additional holding power.

B. Liner Expansion Joint: Provide manufacturer's elastomeric expansion joints with cover plates at 40' intervals or as shown on shop drawings.

C. Sealant: Shall be polyurethane or silicon based water-proofing type, compatible with aluminum gutter, downspout, and abutting dissimilar materials for intended application.

D. All accessories designed for use with the gutters and downspouts are to have the same finish.

2.04 FINISHES

A. Exterior coating to be a High Performance Coating, two-coat, shop applied, 70% Polyvinylidene Fluoride (PVDF) coating based on Elf Arkema Chemicals, Inc. Kynar 500 or Ausimont U.S.A., Inc. Hylar 5000 resin, meeting AAMA 2605 specification.
Color as selected by Architect from manufacturer's standard colors.

B. Interior coating to be a corrosion inhibiting finish.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify governing, dimensions at building; examine, clean and repair, if necessary, any adjoining work on which this work is in any way dependent for its proper installation.

B. Provide and install quantity of downspouts required to accommodate the rainfall at the rate of 1,200 sq. ft. of roof area on the horizontal maximum per downspout.

3.02 INSTALLATION

A. Install gutter using hangers so that movement is not restricted.

B. Gutter hangers shall be installed a maximum of 32" on center and nailed to the roof sheathing or fascia board at rafter locations. Nails shall be 1-1/2" aluminum screw shank nails.

C. Gutters shall not have seams in lengths 40 feet and under.

D. Provide expansion joints on all sides of a hip roof and on runs of more than forty feet in length.

E. Pitch gutters down toward downspouts at 1/16" per foot minimum.

F. Dissimilar materials shall receive a protective coating as required.

G. Gutters shall support a minimum of 50 pounds per linear foot installation.

H. Install interior straps by fully engaging them into gutter's hemmed edge, complete by securely riveting.

I. Rivet and seal liner joints with high grade exterior sealant.

J. All downspouts shall empty onto the finish grade unless otherwise indicated on the drawings to empty into a storm drainage system.
If downspouts empty into a storm drainage system, provide connecting boots of the proper material and style required to coordinate with site work components.
Downspouts emptying onto grade are to include concrete splash blocks at each outlet.

3.03 CLEANING

A. Clean work under provisions of Section 01 70 00.

B. Clean all aluminum surfaces

C. All scrap materials shall disposed off-site.

3.04 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01 70 00.

END OF SECTION

SECTION 07 72 00

ROOF ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Furnish and install roof accessories and all associated components as outlined in this specification section.

1.02 RELATED SECTIONS

A. Work specified elsewhere including, but not limited to, the furnishing and installing of the roofing system, wood nailers, flashings, and vapor barrier as occurring.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide data on product materials, characteristics, performance criteria, limitations and durability.

C. Samples: Provide as requested by Architect.

D. Manufacturer's installation instructions submitted indicating preparation required and installation techniques.

E. Submit Material Safety Data Sheets for all liquid, paste or gaseous components.

F. Submit shop drawings including standard detail drawings of product and recommended layout drawings.

1.04 QUALITY ASSURANCE

A. Regulatory requirements: Conform to all applicable Local and State Codes.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section must have a minimum of five years documented experience.

B. Installer: Company specializing in performing the work of this section must have a minimum of five years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products under provisions of Section 01 60 00.

1.07 PROJECT/SITE CONDITIONS

A. Roof surface shall be free of ponded water, snow or ice.

1.08 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on drawings.

1.09 COORDINATION

A. Coordinate and schedule installation of accessories with related work of other sections such as flashing, wood nailers, roofing system and vapor barrier as occurring.

1.10 WARRANTY

A. Provide warranty under provisions of Section 01 78 00.

PART 2 - PRODUCTS

2.01 PRODUCTS

A. Snow Guards
1. Manufacturer: Basis of design: Berger Building Products, Inc
a. Substitutions: Under provisions of Section 01 60 00.
2. Product Description: Model: F-Rail Snow Retention System
A. System consists of a bracket fastened to each standing seam. Atached with four stainless steel set screws. Two stainless steel square tubes are then inserted into sockets on each bracket. Install each end of the tubes with a dab of Surebond Everseal (SB-190) (or equal) sealant in the receiver pockets to ensure a snug fit.
B. Snow guard bracket to be a F-Casting that is designed to accommodate a seam of up to 1/2” thick and two inches high. Mill finish.
C. The tubing for the F-Rail is Stainless Steel, TBSS20 (1”x 1” x 20’), cut to a length to fit between each bracket. Provide black plastic end caps.
D. One row of the snow guard system is to be installed a minimum of one foot inside from the exterior face of the building’s exterior wall. See drawings for quantity and locations of snow guards.

B. Substitutions: Under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.01 INSPECTION AND ACCEPTANCE
A. Inspect all surfaces to receive work of this section. Correct any defects affecting installation.

3.02 INSTALLATION

A. Install all products in accordance with manufacturer's instructions and requirements.

3.03 CLEANING

A. Clean work under provisions of Section 01 70 00.

B. Remove all debris from roof upon completion of installation and dispose in accordance with all applicable codes and laws.

END OF SECTION

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SECTION 07 92 13

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.

B. Related Sections:

1. Section 13 12 50 – Metal Building System

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.4 SUBMITTALS

A. Submit under provisions of Section 0133 00.

B. Product Data: For each joint-sealant product indicated.

C. Sustainable Design Submittals:
1. Product Data for Credit EQ 4.1: For sealants and sealant primers used inside the weatherproofing system, including printed statement of VOC content.

D. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

E. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

F. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

H. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

1.5 QUALITY ASSURANCE

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

B. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

C. Deliver, store, protect and handle products to site under provisions of Section 0160 00.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Warranty Period: Twoyears from date of Substantial Completion. Provide under the provisions of Section 0178 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers as listed below

B. Substitutions: Under provisions of Section 0160 00.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full standard range.

2.3 SILICONE JOINT SEALANTS

A. Single-Component, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT, G, A and O.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Dowsil 795 Silicone structural Sealant.
b. GE Advanced Materials: SilPrufSCS- 2000
c. Tremco Incorporated; Spectrem 2
d. Pecora 864 Silicone

2.4 URETHANE JOINT SEALANTS

A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Pecora Corporation; DynatrolI-XL.
b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
c. Tremco Incorporated; Dymonic 100

2.5 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings Rods: ASTM C 1330, Type C, Closed Cell, provide backing rods of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
   3. Remove laitance and form-release agents from concrete.
   4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
      a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

B. Clean under provisions of Section 0170 00.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage

or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Perimeter joints of exterior openings where indicated.
      c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
      d. Other joints as indicated.
   2. Urethane Joint Sealant: Single component, nonsag, Class 35
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full standard range.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Construction joints in cast-in-place concrete.
      b. Joints between metal panels.
      c. Joints between different materials listed above.
      d. Perimeter joints between materials listed above and frames of doors, windows and louvers.
      e. Control and expansion joints.
      f. Other joints as indicated.
   2. Silicone Joint Sealant: Single component, Type S, Grade NS, Class 50.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full standard range.

END OF SECTION

SECTION 08 33 23

OVERHEAD UNINSULATED ROLLING DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.02 SECTION INCLUDES

A. Furnish and install overhead uninsulated rolling doors and appurtenant work as indicated on the drawings, door schedule and as herein specified.

1.03 RELATED SECTIONS

A. Section 01 22 00 – Alternate No. 2
B. Section 05 50 00 -Miscellaneous Metal Work
C. Section 09 91 00 – Painting
D. Section 13 12 50 – Metal Building System
E. Division 26 - Electrical

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Submit manufacturers product data and installation instructions for each type of rolling door. Include both published data and any specific data prepared for this project.

C. Shop Drawings: Submit shop drawing for approval prior to fabrication. Include detailed plans, elevations, details of framing members, required clearances, anchors, and accessories. Include relationship with adjacent materials.

1.05 QUALITY ASSURANCE

A. Manufacturer: Rolling doors shall be manufactured by a firm with a minimum of five years experience in the fabrication and installation of rolling doors. Manufacturers proposed for use, which are not named in these specifications, shall submit evidence of ability to meet performance and fabricationrequirements specified, and include a list of five projects of similar design and complexity completed within the past five years.

B. Installer: Installation of rolling doors shall be performed by the authorized representative of the manufacturer.

C. Single-Source Responsibility: Provide doors, guides, and related primary components from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

D. Pre-Installation Conference: Schedule and convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

1.06 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on drawings. Any inconsistencies or conflicts shall be reported to the architect prior to installation.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle under provisions of Section01 60 00.

B. Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturers instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

1.08 WARRANTY

A. Provide two year warranty under provisions of Section 01 78 00.

B. Electric motor operator to be a minimum 2 year warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Subject to compliance with requirements of this Specification Section, provide products listed herein from one of the following:
1. Ceco/Windsor Door
2. The Cookson Company
3. Overhead Door Corporation

B. Basis of Design: Overhead Door Corporation

C. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. Trade Reference: 620 Series uninsulated Service Doors by Overhead Door Corporation.

B. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
1. Slat profile type F-265 fabricated of 20 gauge galvanized steel.

C. Windload Design: Provide High wind load option.

D. Weatherseals: Vinyl bottom seal, exterior guide seals, internal hood seals and lintel seal.

E. Bottom Bar: Two prime painted galvanized steel angles, thickness 1/8" bolted back to back to reinforce curtain in the guides.

F. Guides: Roll-formed steel shapes attached to continuous steel wall angle. Guides are to be weatherstripped with a vinyl weather seal at each jamb on the exterior curtain side.

G. Brackets: Hot rolled galvanized steel to support counterbalance, curtain and hood.

H. Counterbalance: Helical torsion spring type designed for 50,000 cycle life design. Counterbalance shall be housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 per foot of span. Counterbalance shall be adjustable by means of an adjusting tension wheel.

I. Hood: Galvanized steel, 24 gauge hood with intermediate supports as required. Provide with internal hood baffle weatherseal.

J. Wall Mounting Condition: Face-of-wall mounting.

K. Vision Lites: Provide with uniformly spaced openings.
   a. Opening Size: 3 inch by 5/8 inch (76 mm by 16 mm).
   b. Provide with Plexiglas covers over openings.
   c. Area in each door covered by the vision lites will be : 3’-0” W x 1’-6” H.

L. Locking:
   1. Electric motor operated doors to lock through the operator gearing.

2.03 COMPONENTS

A. Electric motor operator
   1. Model RHX: 3/4 h.p., 115 volt, 1 phase, with on-board radio receiver.

B. Electric Operator Controls
   1. Interior push button: Three button open/close/stop, surface mounted, NEMA 1
   2. Radio-Control System: Consisting of the following:
      a. Provide a total of eight (8) multi-function remote control operators.
      b. Provide three-channel universal coaxial receivers to open, close, and stop door.
      c. Remote antennas and mounting kits.

C. Safety Sensing Device: Safe-T-Beam photoelectric eye system that senses an obstruction and signals the operator to stop or reverse the door.

2.03 FINISH

A. Galvanized Steel: Slats and hood shall be galvanized steel in accordance with ASTM A 653 and receive rust-inhibitive, roll coating process, including, 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on powder coated top coat. Provide PowderGuard Premium powder coat finish - 2 year warranty).
Color as selected by Architect from manufacturer's standard colors.

B. Non-galvanized, exposed. Ferrous surfaces will receive one coat of rust-inhibitive primer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Field verify all dimensions prior to fabrication.

B. Verify and coordinate any possible obstructions. Notify Architect prior to fabrication of any inconsistencies.

3.02 INSTALLATION

A. Install in accordance with manufacturer's specifications and instructions. Coordinate installation with adjacent work to insure proper clearances and allow for maintenance.

B. Install door, guides and associated equipment plumb, square and level.

C. Anchor all items securely.

D. Door assembly shall be weather-tight if weatherstripping option is included.

3.03 ADJUSTING AND CLEANING

A. Test rolling doors for proper operation and adjust as necessary to provide proper operation without binding or distortion. Lubricate as required.

B. Touch-up damaged coatings and finishes and repair minor damage. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned.

C. Instruct Owner’s personel in proper operating procedures and maintenance schedule.

3.04 SCHEDULE

A. Garage Doors
1. Quantity: Four (4)
2. Size: 14’-0” wide x 14’-0” high opening
3. Controllers (Each door to have): One Interior push button as described above.
4. Provide a total of eight (8) remote control door operators.

END OF SECTION

SECTION 08 33 25

OVERHEAD INSULATED ROLLING DOORS
(ALTERNATE NO. 2)

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.01 SECTION INCLUDES

A. Furnish and install insulated overhead rolling doors and appurtenant work as indicated on the drawings, door schedule and as herein specified.

B. See Alternate No. 2 requiring the purchase and installation of overhead insulated rolling garage doors in lieu of the Base Bid uninsulated rolling garage doors.

1.02 RELATED SECTIONS

A. Section 01 22 00 – Alternate No. 2
B. Section 05 50 00 -Miscellaneous Metal Work
C. Section 09 91 00 – Painting
D. Section 13 12 50 – Metal Building System
E. Division 26 - Electrical

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Submit manufacturers product data and installation instructions for each type of rolling door. Include both published data and any specific data prepared for this project.

C. Shop Drawings: Submit shop drawing for approval prior to fabrication. Include detailed plans, elevations, details of framing members, required clearances, anchors, and accessories. Include relationship with adjacent materials.

1.04 QUALITY ASSURANCE
A. Manufacturer: Rolling doors shall be manufactured by a firm with a minimum of five years experience in the fabrication and installation of rolling doors. Manufacturers proposed for use, which are not named in these specifications, shall submit evidence of ability to meet performance and fabricationrequirements specified, and include a list of five projects of similar design and complexity completed within the past five years.

B. Installer: Installation of rolling doors shall be performed by the authorized representative of the manufacturer.

C. Single-Source Responsibility: Provide doors, guides, motors, and related primary components from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

D. Pre-Installation Conference: Schedule and convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

1.05 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on drawings. Any inconsistencies or conflicts shall be reported to the architect prior to installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle under provisions of Section01 60 00.

B. Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturers instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

1.07 WARRANTY

A. Provide 2 year warranty under provisions of Section 01 78 00.

B. Electric motor operator to be a minimum 2 year warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Subject to compliance with requirements of this Specification Section, provide products listed herein from one of the following:
1. Ceco/Windsor Door
2. The Cookson Company
3. Overhead Door Corporation

B. Basis of Design: Overhead Door Corporation

C. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. Trade Reference: 625 Series Stormtite Insulated Service Doors by Overhead Door Corporation.

B. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
   1. Flat profile type F-265I for doors up to 40'-0" wide. The front slat shall be fabricated of 22 gauge galvanized steel. The back slat shall be 24 gauge galvanized steel.
   2. Slat cavity shall be filled with CFC-free foamed-in- place, polyurethane insulation. Thermal value of R=7.7.

C. Windload Design: Provide High wind load option

D. Weatherseals: Vinyl bottom seal, exterior guide seals, internal hood seals, interior guide seals and lintel seals.

E. Bottom Bar: Two prime painted galvanized steel angles, thickness 1/8" bolted back to back to reinforce curtain in the guides.

F. Guides: Roll-formed steel shapes attached to continuous steel wall angle. Guides are to be weatherstripped with a vinyl weather seal at each jamb on the exterior curtain side.

G. Brackets: Hot rolled galvanized steel to support counterbalance, curtain and hood.

H. Counterbalance: Helical torsion spring type designed for 50,000 cycle life design. Counterbalance shall be housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 per foot of span. Counterbalance shall be adjustable by means of an adjusting tension wheel.

I. Hood: Galvanized steel, 24 gauge hood with intermediate supports as required. Provide with internal hood baffle weatherseal.

J. Wall Mounting Condition: Face-of-wall mounting.

K. Vision Lites: Provide with uniformly spaced openings.
   a. Opening Size: 3 inch by 5/8 inch (76 mm by 16 mm).
   b. Provide with Plexiglas covers over openings.
   c. Area in each door covered by the vision lites will be : 3’-0” W x 1’-6” H.

L. Locking:
   1. Electric motor operated doors to lock through the operator gearing.

2.03 COMPONENTS

A. Electric motor operator
   1. Model RHX: 3/4 h.p., 115 volt, 1 phase, with on-board radio receiver.

B. Electric Operator Controls
   1. Interior push button: Three button open/close/stop, surface mounted, NEMA 1
   2. Radio-Control System: Consisting of the following:
      a. Provide a total of eight (8) multi-function remote control operators.
      b. Provide three-channel universal coaxial receivers to open, close, and stop door.

c. Remote antennas and mounting kits.

C. Safety Sensing Device: Safe-T-Beam photoelectric eye system that senses an obstruction and signals the operator to stop or reverse the door.

2.05 FINISH

A. Galvanized Steel: Slats and hood shall be galvanized steel in accordance with ASTM A 653 and receive rust-inhibitive, roll coating process, including, 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on powder coated top coat. Provide PowderGuard Premium powder coat finish - 2 year warranty).
Color as selected by Architect from manufacturer's standard colors.

B. Non-galvanized, exposed. Ferrous surfaces will receive one coat of rust-inhibitive primer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Field verify all dimensions prior to fabrication.

B. Verify and coordinate any possible obstructions. Notify Architect prior to fabrication of any inconsistencies.

3.02 INSTALLATION

A. Install in accordance with manufacturer's specifications and instructions. Coordinate installation with adjacent work to insure proper clearances and allow for maintenance.

B. Install door, guides and associated equipment plumb, square and level.

C. Anchor all items securely.

D. Door assembly shall be weather-tight if weatherstripping option is included.

3.03 ADJUSTING AND CLEANING

A. Test rolling doors for proper operation and adjust as necessary to provide proper operation without binding or distortion. Lubricate as required.

B. Touch-up damaged coatings and finishes and repair minor damage. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned.

C. Instruct Owner’s personel in proper operating procedures and maintenance schedule.

3.04 SCHEDULE

A. Garage Doors

1. Quantity: Four (4)
2. Size: 14’-0” wide x 14’-0” high opening
3. Controllers (Each door to have): One Interior push button as described above.
4. Provide a total of eight (8) remote control door operators.

END OF SECTION

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SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Finish painting and priming of all items exposed and identified to receive a finish.

1.02 RELATED SECTIONS

A. Examine the specifications for the various other trades and become thoroughly familiar with all their provisions regarding what they are painting. All surfaces that are left unfinished by the requirements of other specifications shall be painted or finished as a part of this work.

1.03 REFERENCES

A. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

C. Federal Specifications

1.04 DEFINITIONS

A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

B. The term "paint" as used herein includes enamels, paint, emulsions, varnishes, stains, sealers and other coatings whether used as prime, intermediate or finish coats.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit manufacturer's technical data sheet and Material Safety Data Sheets (MSDS) for each scheduled coating, giving the descriptive data, curing time, mixing, thinning and application instructions. Provide certification that paint was formulated within lead or mercury.

C. Submit manufacturer's fan deck of color chips for selection of colors by the Architect.

D. Samples

1. At the request of the Architect, prepare and submit paint samples on the materials he requires for approval.
2. Prepare and submit stained wood samples on the type and quality of wood specified for use on the project as requested by the Architect.

1.06 QUALIFICATIONS

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with five years experience.
B. Applicator: Company specializing in commercial painting and finishing with 3 years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements for finishes.

1.08 FIELD SAMPLES

A. At the request of the Architect, provide field sample panel, one complete surface of each color scheme illustrating special coating, color, texture, finish and workmanship.

B. Locate where directed by the Architect.

C. If approved, sample area will serve as a minimum standard for Work throughout the building. Accepted sample may remain as part of the Work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and protect products under provisions of Section 01 60 00.

B. Deliver all paint materials to the job site ready mixed and in their original containers with all labels intact and legible at time of use.

C. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.

D. Use all means necessary to insure the safe storage and use of paint materials.

E. All soiled or used rags, waste and trash must be disposed off site every night and every precaution taken to avoid the danger of fire.

F. All materials must be stored at above freezing temperature.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent.

C. Application Temperature for Paints: 50 degrees F minimum, and 95 degrees F maximum.

D. Application Temperature for Varnish and Other Natural Finishes: 65 degrees F minimum and 90 degrees F maximum.

E. Provide lighting level of 80 ft. candles measured mid-height at substrate surface.

F. Do not apply paint to areas where dust is being generated.

1.11 COORDINATION

A. Coordinate work under provisions of Section 01 31 00.

1.12 EXTRA MATERIALS

A. Furnish under provisions of Section 01 78 00 extra paint equaling approximately 10% of each color and gloss used in each coating material used, tightly sealed in clearly labeled containers.

B. The additional material shall be properly packaged for long term storage and delivered to the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

A. Acceptable manufacturers:
   1. Exterior Paint:
      a. Sherwin Williams
      b. Pittsburgh Paint
      c. Benjamin Moore Paint

B. Substitutions: Under provisions of Section 01 60 00.

2.02 COMPATIBILITY:

A. All paint materials and equipment shall be compatible in use; finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; all tools and equipment shall be compatible with the coating to be applied.

B. Thinners, when used, shall be only those thinners recommended for that purpose by the manufacturer of the material to be thinned.

2.03 MIXING AND TINTING:

A. Accomplish job mixing and tinting only when acceptable to the Architect. Mix only in mixing pails placed in suitable sized non-ferrous or oxide resistant metal pans.

B. Tints and all other additives or thinners shall be used only as recommended by the manufacturer of the paint and as approved by the Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

B. In the event of discrepancy, immediately notify the Architect.

C. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 PREPARATION:

A. General

1. Prior to all surface preparation and painting operations, completely mask, remove or otherwise adequately protect all hardware, accessories, machined surfaces, plates, lighting fixtures, and similar items in contact with painted surfaces but not schedule to receive paint.
2. Remove all existing loose, flaking and poor condition paint by scraping and then sanding surface. Sand as required to feather edges of remaining paint.
3. Spot prime all exposed nails and other metals that are to be painted with emulsion paints, using a primer recommended by the manufacturer of the coating system.
4. Surface to be painted shall be thoroughly clean and dry. All concrete and masonry work shall be completely cured.
5. All items concealing surfaces to be painted that are readily detachable shall be removed for the painting of said surface. Reinstall upon completion of space.
6. Provide minimum of one coat of primer and minimum of two coats of finish paint. The shop priming coat, as occurring, shall substitute for the field applied primer coat.
7. Complete coverage is required. Provide additional coats to areas that do not show complete coverage.

B. Preparation of wood surfaces:

1. Clean all wood surfaces until they are free from dirt, oil, and all other foreign substance.
2. Smooth all finished wood surfaces exposed to view, using the proper sandpaper.
3. Where so required, use varying degrees of coarseness in sandpaper to produce uniformly textured and unmarred wood surfaces.
4. On small, dry, seasoned knots, thoroughly scrape and clean the surface and apply one coat of good quality knot-sealer before application of the priming coat.
5. On large, open, unseasoned knots, scrape off all pitch and thoroughly clean the area, followed by an application of one coat of good quality knot-sealer.
6. Back prime all wood mouldings and trim.
7. Fill nail holes, cracks, open joints and other defects with oil based putty after priming coat has dried. Color to match finish color.

C. Preparation of metal surfaces:

1. Galvanized Metal

   a. Clean all surfaces thoroughly with solvent until they are completely free from dirt, oil and grease.
   b. Thoroughly treat the cleaned surface with phosphoric acid etch.
   c. Remove all excess etching solution and allow to dry completely before application of paint.
   d. Prepare surface in accordance with recommendations of directions of manufacturer of rust-inhibitive primer.
   e. New galvanized metal is to be allowed to weather 6 months prior to coating. If weathering is not possible, clean with solvents per manufacturer's instructions, and verify test patch adhesion with Architect.

2. Other Metals

   a. Thoroughly clean all surfaces until they are completely free from dust, dirt, oil, loose rust and grease.
   b. All shop-primed surfaces that have been marred or abraded shall be wire-brushed and touched up with the same material as the shop coat prior to painting of surfaces.

3. Preparation of existing aluminum surfaces:
   a. Thoroughly clean all surfaces per manufacturer’s instructions until they are completely free from dirt, oil and grease.
   b. Apply a test area, allow paint to dry one week before testing adhesion. If adhesion is poor, discuss solutions with Architect.
   c. Do not use hydrocarbon solvents for cleaning.

D. Preparation of Concrete and Masonry

1. Concrete and masonry shall be repaired before painting.
2. Dirt, fungus, grease and oil shall be removed prior to application of paint by washing with a solution composed of from 2 to 8 ounces of tri-sodium phosphate per gallon of hot water and then rinsing thoroughly with fresh water.
3. Efflorescence shall be removed from concrete and masonry surfaces by scraping, wire brushing and washing with 5 to l0 percent solution of muriatic acid and then washing thoroughly with fresh water.
4. Unless otherwise recommended by the manufacturer of the paint materials as approved, all concrete and masonry surfaces to be painted shall be given a neutralizing treatment consisting of 2 pounds of zinc-sulfate in one gallon of warm water. The neutralizer shall be applied liberally and allowed to dry, following which the surfaces shall be rinsed thoroughly with clean water and allowed to dry for not less than 48 hours before paint is applied.

3.03 APPLICATION

A. General

1. Apply all paint in accordance with manufacturer's instructions.
2. Do not apply the initial coating until moisture-meter reading of the surface is within limits recommended by the paint materials manufacturer.
3. Allow sufficient drying time between coats in accordance with manufacturer's recommendations.
4. Oil base and Oleo resinous solvent type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting or less of adhesion of the undercoat.
5. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
6. Sand, dust, and clean between coats to remove all defects visible to the unaided eye from a distance of five feet.
7. Finished surfaces shall be free from runs, drops, ridges, waves, laps, sags and unnecessary brush marks.
8. Slightly vary the color of succeeding coats.
9. Primer and intermediate coats shall be tinted to approximately the tint of finish coats.
10. Damaged painting shall be retouched before applying the succeeding coat.
11. Do not apply additional coats until completed coat has been inspected and approved by the Architect.
12. Only inspected and approved coats of paint will be considered in determining the number of coats applied.
13. Edges of paint abutting other materials or colors shall be clean and sharp with no overlapping.
14. Refinish entire wall where portion of finish has been damaged or is not acceptable.
15. Refinish all woodwork that has been removed and reset.
16. Colors will be selected by Architect from manufacturer’s full color palette.
17. Unlimited number of different colors allowed per project. Number of colors is to be determined by Architect and included in a color schedule that will be assembled after submittal of color sample fantex by the General Contractor prior to commencement of work.

3.04 CLEANING

A. Prevent accidental spilling of paint materials and, in event of such spill, immediately remove all spilled material, the waste of equipment used to clean up the spill, and wash the surfaces to their original undamaged condition.

B. After completion of the painting work, all glass shall be cleaned on both sides by professional window cleaners. The use of acid solution or water containing caustic soaps will not be permitted. The edge of compound shall not be disturbed by scrapers. Upon completion of contract, the glass shall be left whole, free of any defacements or rattle and shall be clean on both sides.

C. Prior to final inspection visually inspect all surfaces and remove all paint and traces of paint from surfaces not scheduled to be painted.

D. Paint storage space shall be thoroughly cleaned following the completion of all work.

E. All waste materials shall be disposed of properly and in accordance with all Federal, State, and Local regulations. Do not dispose of waste materials in the building sanitary waste system.

3.05 WASTE MANAGEMENT

A. Set aside extra paint for future color matches. All paint unused by the Contractor is to be delivered to the Owner in sealed containers.

B. Close and tightly seal all partly used paint and finish containers and store in a well-ventilated, safe area at moderate temperature.

C. Do not dispose of paints or solvents by pouring on ground. Place in designated containers for proper disposal.

3.06 PAINTING SCHEDULE

A. Exterior: Based on Sherwin Williams Paints.

1. Wood
   1st Coat: S-W Exterior Oil Based Primer
   (4 mils wet, 1.4 mils dry)
   2nd & 3rd Coats: S-W Resilience Latex Satin K43 Series
   (4 mils wet, 1.52 mils dry per coat)

2. Ferrous Metals (doors, frames, steel)
   1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series
   (5-10 mils wet, 2-4 mils dry)
   2nd & 3rd Coats: S-W Pro Industrial DTM Acrylic Semi-Gloss, B66 Series
   (4 mils wet, 1.5 mils dry per coat)

3. Galvanized Metal (designated to be painted)
   1st Coat: S-W Galvite HS, B50WZ30
   (7 mils wet, 4.5 mils dry)
   2nd & 3rd Coats: S-W All Surface Enamel, A11 Series
   (4 mils wet, 1.6 mils dry per coat)

4. Concrete and Masonry Walls
   1st Coat: S-W Loxon Block Surfacer
   (50 – 100 sq ft/gal)
   2nd & 3rd Coats: S-W Resilience Latex Satin K43 Series
   (4 mils wet, 1.52 mils dry per coat)

5. PVC, Plastic
   1st Coat: 1 coat S-W Adhesion Primer latex, B51W8050
   (4 mils wet, 1.7 mils dry)
   2nd & 3rd Coats: 2 coats S-W Resilience Exterior Gloss K44
   (4 mils wet, 1.6 mils dry per coat)

6. Existing Aluminum
   1 coat - Spray Application: S-W DTM Bonding Primer, B66A50
   (5 mils wet, 2 mils dry minimum)
   2 coats - Spray Application: S-W Pro Industrial DTM Acrylic Semi-Gloss B66- Series
   (6 mils wet, 2.5 mils dry per coat minimum)

END OF SECTION

SECTION 13 12 50

METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SECTION OVERVIEW

A. Structural steel frame.

B. Complete roof covering system consisting of the exterior roof panels, panel attachments, sealants, mastics, trim and flashings as required.

C. Complete wall covering system consisting of the exterior wall panels, panel attachments, sealants, mastics, trim and flashings as required.

D. Windows, personnel doors and frames.

1.2 RELATED SECTIONS

A. Alternate No. 1 – Addition of roof and wall insulation

B. Alternate No. 2 – Overhead insulated garage doors in lieu of uninsulated garage doors

C. Section 03 30 00 - Cast-in-Place Concrete: Foundations and anchor bolts.

D. Section 09 91 00 - Paints and Coatings: Finish painting of structural members, etc.

E. Division 7 - Insulation

F. Division 8 - Overhead Rolling Doors

1.3 REFERENCES

B. ASTM A 36/ASTM A36M - Standard Specification for Carbon Structural Steel.

C. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

D. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

E. ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand.

F. ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

G. ASTMA529/A 529M – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.

H. ASTM A 536 – Specification for Ductile Iron Castings.

I. ASTM A 572/A 572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Steel.

J. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

K. ASTM A 792/A 792M - Standard Specification for Steel Sheets, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

L. ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low Alloy with Improved Formability.

M. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

N. ASTM E 1592 – Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure difference.

O. SDI 100 – Recommended Specifications for Standard Steel Doors and Frames; Steel Door Institute.

P. UL 580 – Tests for Wind Uplift Resistance of Roof Assemblies; Underwriters Laboratories, Inc.

1.4 DEFINITIONS

A. Building Width: Measured from outside to outside of sidewall girts.

B. Building Length: Measured from outside to outside of endwall girts.

C. Building Line: Outside face of horizontal steel girt.

D. Building Eave Height: Measured from the intersection of the top of the roof framing and the outside of the wall framing to the bottom of the sidewall column base plate.

E. Bay Spacing: Measured from centerline to centerline of primary frames for interior bays and from centerline of the first interior frame to outside of endwall girts for endbays.

F. Roof Pitch: The ratio of the vertical rise to the horizontal run.

1.5 DESIGN REQUIREMENTS

A. Design structural systems according to professionally recognized methods and standards, and local, state and federal building codes and laws.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in Rhode Island and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal building systems that are similar to those indicated for this Project in material, design, and extent.

C. Supplier must be a primary manufacturer of frames, secondary steel, roof and wall sheeting and trim.

D. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include primary and secondary framing, roof and wall panels, and accessories complying with requirements indicated.
   1. Structural Steel Design Standard: All structural steel sections and built-up welded-plate members shall be designed in accordance with the applicable sections relating to the allowable stress design requirements of the latest edition of the American Institute of Steel Construction (AISC), Specification for Structural Steel Buildings - Allowable Stress Design.
   2. Cold-Formed Steel Design Standard: All light-gauge, cold-formed structural members and panels shall be designed in accordance with the applicable sections relating to the allowable stress design requirements of the latest edition of the American Iron and Steel Institute (AISI), North American Specification for the Design of Cold-Formed Steel Structural Members.

E. Metal Building System Design: As follows:
   1. Primary Frame Type: Provide the following:
      a. Rigid Clear Span: Solid-member structural-framing system without interior columns.
   2. End-Wall Framing: As follows:
      a. Provide primary frame, capable of supporting one-half of a bay design load, and end-wall columns.
   4. Secondary Frame Type: Standard purlins and girts flush-framed.

F. Structural Performance: Provide metal building systems capable of withstanding the effects of the selfweight of the building system and the following loads and stresses within limits and under conditions indicated:
   1. Engineer metal building systems according to procedures in MBMA's "Metal Building Systems Manual."
   2. Design Loads: As specified below:
   3. Design Loads: Comply with load requirements of MBMA's "Metal Building Systems Manual."
   4. Design Loads: As specified below:
      a. Live loads as required by the current Rhode Island Building codes.
      b. Wind Loads: mph basic wind speed, 139
      c. Collateral Loads: psf for dead loads, other than the weight of metal building system, from permanent items such as sprinklers, mechanical systems, electrical systems, and ceilings.
      d. Auxiliary Loads: From dynamic live loads, such as those generated by cranes and material handling equipment, as shown on the contract documents.
   5. Load Combinations: The metal building systems shall be designed to withstand the most critical effects of load factors and load combinations as required by the building code in effect for this Project.
   6. Deflection Limits: Assemblies shall be engineered to withstand design loads with deflections no greater than the following:
      a. Purlins and Rafters: Vertical deflection of 1/240 of the span.

b. Girts: Horizontal deflection of 1/240 of the span.
c. Roof Panels: Vertical deflection of 1/240 of the span.
d. Wall Panels: Horizontal deflection of 1/240 of the span.

7. Secondary framing system shall be designed to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.

G. Seismic Performance: Design and engineer metal building systems capable of withstanding the effects of earthquake motions determined according to the building code in effect for this Project.

H. Wind-Uplift Resistance: Provide roof panel assemblies that meet requirements of UL 580 for wind-uplift resistance Class 90.

I. Thermal Movements: Provide metal building roof and wall panel systems that allow for thermal movements resulting from the maximum change (range) in ambient and surface temperatures determined for this geographical region by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

J. Anchor Bolts: Furnish anchor bolt diameters, calculated on the basis of stress in the steel bolt, to resist the column reactions induced by the design loads on the structure. Anchor bolts and embedment requirements furnished by others.

1.6 REGULATORY REQUIREMENTS

A. The product and installation of the product shall comply with all Local, State, and Federal codes.

1.7 QUALITY ASSURANCE

A. Erector Qualifications: An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

B. 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.

C. Source Limitations: Obtain each type of metal building system component through one source from a single manufacturer.

D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code—Steel."

E. Regulatory Requirements: Fabricate and label structural framing to comply with the state's special inspection requirements at point of fabrication for welding and other connections required by authorities having jurisdiction.

1.8 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Design Data: Provide design criteria and structural calculations.

C. Certification: Manufacturer certification that the building conforms to the contract documents and manufacturer's standard design procedures.

D. Shop Drawings: Show building layout, primary and secondary framing member sizes and locations, cross-sections, and product and connection details.

E. All submitted design data and shop drawings are to be stamped by a professional engineer licensed in Rhode Island

F. Design Certificate: Signed and sealed by a qualified professional engineer licensed in Rhode Island. Include, at a minimum, the following:
   1. Name and location of Project.
   2. Order number.
   3. Name of manufacturer.
   4. Name of Contractor.
   5. Building dimensions, including width, length, height, and roof slope.
   6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
   7. Governing building code and year of edition.
   8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic criteria (seismic zone or effective peak velocity-related acceleration/peak acceleration coefficients), and auxiliary loads (cranes).
   9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to the governing building code.
   10. Building-Use Category: Indicate category of building use and its effect on load importance factors.

G. Product Data: Information on manufactured products to be incorporated into the project. Provide data on personnel doors and windows.

H. Color Charts: For selection of colors for all components.

I. Anchor Bolt Drawings: Layouts with bolt diameters.

J. Welding Certificates: Copies of certificates for welding procedures and personnel.

K. Specimen Warranty

L. Samples for Verification: For the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected, in the profile and style indicated. Prepare Samples from the same material to be used for the Work.
   1. Roof Panels: 12 inches long by actual panel width. Include clips, caps, fasteners, closures, and other exposed panel accessories.
   2. Wall Panels: 12 inches long by actual panel width. Include clips, caps, fasteners, closures, and other exposed panel accessories.
   3. Translucent Panels: 12 inches long by actual panel width.

4. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
5. Windows: Full-size, 12-inch-long frame samples showing typical profile.

1.9 STORAGE AND HANDLING

A. Handling: Unload, store, and erect roof and wall panels to prevent bending, warping, twisting, and surface damage.

B. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather-tight and ventilated covering. Store roof and wall panels to ensure dryness. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

1.10 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when weather conditions permit roof and wall panel installation to be performed according to manufacturer's written instructions and warranty requirements.

1.11 COORDINATION

A. Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

1.12 WARRANTY

A. Provide manufacturer’s standard warranty under provisions of Section 01 78 00 for:
1. Standard warranty on materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. 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:
1. Basis of design:
Corle Building Systems

2. Manufacturers offering equivalent products:
a. Ceco Building Systems.
b. American Buildings Company; Division of Magnatrax Corp.
c. Butler Manufacturing Company; a BlueScope Steel company.

B. Substitutions: Under provisions of Section 01 60 00.

C. Submit manufacturer’s company profile and history to Architect for approval

D. Manufacturer must be certified by American Institute of Steel Construction (AISC) in the Metal Building category.

E. Metal building is to be designed by the manufacturer/installer and submitted to Architect for review and approval.

2.2 METAL MATERIALS

A. Select materials and material yield strengths based on building design requirements; use the following unless required otherwise.

B. Structural Steel Plate, Bar, Sheet, and Strip for Use in Bolted and Welded Constructions: ASTM A 572, A 1011, A 529, ASTM A 1008 Grade 55 with minimum yield strength of 55,000 psi.

C. Structural Steel Material for Use in Roll Formed or Press Broken Secondary Structural Members: ASTM A 1011,or A 1008 Grade 55 with minimum yield strength of 55,000 psi.

D. Galvanized Steel Sheet for Roll Formed or Press Broken Roof and Wall Coverings, Trim and Flashing: ASTM A 653, with minimum yield strength of 50,000 psi. Coating Designation G-90. 24 Ga. for roof panels and 26 Ga. for wall panels.

E. Hot Rolled Steel Shapes: W, M and S shapes, angles, rods, channels and other shapes; ASTM A 572/A 529/A 500 or ASTM A 36 as applicable; with minimum yield strengths required for the design.

F. Bracing Cable: ASTM A 475, extra-high-strength grade, Class A zinc-coated, seven-strand steel.

G. Structural Bolts and Nuts Used with Primary Framing: High strength, ASTM A 325.

H. Bolts and Nuts Used with Secondary Framing Members: ASTM A 325.

I. Shop Coat: Manufacturer's standard rust inhibitive primer paint; manufacturer's standard color.

I. Pre-Painted Finish: Kynar 500 finish on exterior metal roof and wall panels.
   1. Color: As selected by Architect from manufacturer's standard colors.
   2. Provide 25 year paint warranty.

2.3 FRAMING COMPONENTS

A. Primary Framing: Solid web framing consisting of tapered beams supported by uniform depth columns. Provide a clear span that supports the loads at bay spacings indicated.

B. Deck Frame: Standard pre-engineered, primary framing used in conjunction with metal decking.

C. Purlins: Zee-shaped with depth as required; with minimum yield strength of 55,000 psi; simple span or continuous span as required for design.

D. Girts: Zee- or Cee-shaped; sized as required, with minimum yield strength of 55,000 psi; simple span or continuous span as required for design.

E. Transbay Members: Open web, parallel chord, secondary joists; simple span, utilizing materials, sizes and yield strength as required.

F. Wind Bracing: Portal, torsional, diaphragm or diagonal bracing in accordance with manufacturer's standard design practices; utilizing rods, cables, angles, and other members, with minimum yield strengths as required for design.

G. Primary Frame Flange Bracing: Attached from purlins or girts to the primary framing, minimum yield strength as required for design.

H. Sag Angles and Bridging: Steel angles, with minimum yield strength of 36,000 psi.

I. Fabrication: Fabricate according to manufacturer's standard practice.
   1. Fabricate structural members made of welded plate sections by joining the flanges and webs by continuous automatic submerged arc welding process.
   2. All welding operators and processes shall be qualified in accordance with the American Welding Society "Structural Welding Code", AWS D1.1.
   3. Field connections. Prepare members for bolted field connections by making punched, drilled, or reamed holes in the shop.

J. Component Identification: Mark all fabricated parts, either individually or by lot or group, using an identification marking corresponding to the marking shown on the shop drawings, using a method that remains visible after shop coating.

K. Shop Coating: Finish all structural steel members using one coat of manufacturer's standard shop primer coat, after cleaning of oil, dirt, loose scale and foreign matter.

L. Package building components for shipping by common carrier.

M. Provide overhead door support framing as required.

2.4 ROOF AND WALL PANEL COMPONENTS

A. Roof Panels:
   1. Material: 24 Ga. Galvanized steel.
      (Corle Building Systems Model: Seam-Lok standing seam 18" wide roof panels or equal)
   2. Length: Continuous from eave to ridge.
   3. Double-folded mechanically seamed trapezoidal-ribbed roof panels fabricated from metallic-coated steel sheets prepainted with coil coating, factory formed to provide 18-inch coverage; with 3-inch-high (including seam) raised trapezoidal major ribs at panel edges, and intermediate stiffening ribs symmetrically spaced between major ribs for full length of panel.
   4. The Roof System shall be tested and certified to meet Underwriters Laboratory UL 90 wind uplift rating with supports 5'-0' on center. UL 90 is a requirement for this project.
   5. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M and the following requirements: TRINAR® Finish: Aluminum-Zinc Alloy-Coated Steel Sheet; ASTM A 792, Class AZ50 or AZ55 coating, Grade 80; structural quality.

B. Wall Panels:
   1. Material: 26 Ga. Galvanized steel.
      (Corle Building Systems Model: "R" wall panels or equal)

2. Length: Continuous from sill to eave.
3. Endlaps, Where Required: 4" wide, located at a support member.
4. Cut panels square at each end; provide base trim at sill.
5. Tested per ASTM E 283 (Air Infiltration).
6. Tested per ASTM E 331 (Water Penetration).
7. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M and the following requirements: TRINAR® Finish: Aluminum-Zinc Alloy-Coated Steel Sheet; ASTM A 792, Class AZ50 or AZ55 coating, Grade 80; structural quality.

C. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of roof or wall sheets by means of factory-applied coating. Comply with the following:
1. Fasteners for Roof and Wall Panels: Self-drilling/self-tapping, zinc-plated, hex-head carbon-steel screws, with a zinc-aluminum-alloy head and EPDM sealing washer.
2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
3. Blind Fasteners: painted steel for Trinar®- coated material.

D. Flashing and Trim: Form from 0.0190-inch-thick, aluminum-zinc alloy-coated steel sheet plain or prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent roof or wall panels.
1. Opening Trim: Minimum 0.0190-inch-thick steel sheet. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

E. Gutters: Form from 0.0190-inch-thick, aluminum-zinc alloy-coated steel sheet, prepainted with coil coating. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in 195- and/or 243-inch-long sections, sized according to SMACNA's Architectural Sheet Metal Manual. Furnish gutter supports spaced 24 inches o.c., fabricated from same metal as gutters. Finish gutters to match roof fascia and rake trim.

F. Downspouts: Form from 0.0190-inch-thick, aluminum-zinc alloy-coated steel sheet, prepainted with coil coating; in 4-inch by 5-inch, 10-foot-long sections, complete with formed 75- degree elbows and offsets. Finish downspouts to match wall panels. Provide boots if outlet is to be installed into storm drainage system.

G. Foam Closures: Closed-cell, laminated polyethylene; minimum 1-inch-thick, flexible closure strips; premolded to match roof and wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

H. Metal Closures: Provide closures at eave and ridge for the following applications:
1. Outside closure for ridge condition of standing seam roof systems, fabricated from 0.0239-inchthick steel.
2. Inside closure for eave condition of standing seam roof systems, fabricated from 0.0478-inch-thick steel.

I. Standing Seam Roof Clips: Configuration shall be fixed or floating, as required by substrate conditions and/or roof geometry.

J. Standing Seam Roof Backing Plates: Fabricated from 0.0620-inch thick steel.

K. Standing Seam Roof Thermal Spacer Blocks: Provide thermal spacer blocks; fabricated from extruded polystyrene, in sizes as required. Minimum R-value of 5.

L. Roof Curbs: Fabricate curbs from 0.0478-inch-thick, minimum, prepainted with coil coating; with welded top box and bottom skirt, and integral full length cricket/water-diverter. Finish roof curbs to match roof panels unless otherwise indicated.
   1. Insulate roof curb with 1½-inch-thick rigid insulation.

M. Skylight Translucent Panels
   1. Insulated light transmitting panel incorporated within roof panels.
   2. Material: "R" Polycarbonate, soft white with 85% light transmission.
   3. Fire-Test-Response Characteristics: Provide panels tested as identical products per ASTM by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
      a. UL 790
      b. ASTM D 2843-70
      c. ASTM D 1928-68
      d. ASTM D 635-74

2.6 INSULATION

A. Roof and Wall Insulation (Alternate No. 1)
   1. Roof
      a. Two layers of insulation as identified in separate specification sections.
         Top layer to be 4" thick (R20) extruded polystyrene board insulation as specified in section 07 21 13, and installed between thermal spacer blocks.
         The bottom layer is to be 3.7" thick (R11) fiberglass metal building insulation specified in Section 07 21 16.

   2. Walls
      a. Two layers of insulation as identified in separate specification sections.
         Exterior layer to be continuous 3" thick (R15) extruded polystyrene board insulation as specified in section 07 21 13 installed over the interior layer of fiberglass insulation noted below and attached to the girts.
         The interior layer is to be 4.3" thick (R13) fiberglass metal building insulation specified in Section 07 21 16 and installed vertically against the exterior of the girts.

2.12 PERSONNEL DOORS AND FRAMES

A. Self-Framing Personnel Doors: Doors and frames are fabricated to receive factory-applied hardware according to ANSI/DHI A115 Series:
   1. Steel Doors: 1-3/4 inches thick; fabricated from 0.0359-0.0478-inch-thick, zinc-coated (galvanized) steel face sheets with 0.0598-inch-thick, inverted zinc-coated (galvanized) steel channels flush mounted to top and bottom of door to prevent water intrusion.
      a. Face Sheets: Smooth.
      b. Core: Polyurethane foam with U-value rating of at least 0.77 per RI Energy Code.
      c. Frames shall have 6 5/16-inch by 16-inch x 0.1046-ich-thick (galvanized) steel reinforcement at the closer location and 0.1793-inch-thick hinge reinforcements at the hinge locations.
      d. Glazing Frames: Steel frames to receive field-installed glass. See drawings.
         1) Glazing: Insulated, double pane and safety rated (tempered).
   2. Steel Frames: Factory-welded double-rabbeted 2-inch-wide face frames from 0.0620-inch-thick, zinc coated (galvanized) steel sheet, with 5/8-inch stops.
   3. Subframing: Galvanized 0.0620-inch-thick C-shaped sections to match girt depth.
   4. Hardware: Comply with ANSI/DHI A115 Series and the following:
      a. Hardware shall be located according to DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
      b. Provide hardware for each door leaf, as follows:
         1) Hinges: One-and-one-half-pair, full-mortise, ball-bearing, stainless steel hinges, 4-1/2 by 4-1/2 inches, with non-removable pin.
         2) Lockset: meeting Federal Specifications FF-H-106H, Series 160, and ANSI 4000, Grade II
         4) Threshold: Saddle type extruded aluminum, mill finish.
         5) Closer: Surface-applied, parallel arm, heavy-duty hydraulic type.
         6) Weather Stripping: Kerf applied to head and jamb stops.
         7) Sweep: Three-finger, concealed.
   5. Anchors and Accessories: Manufacturer's standard units, galvanized according to ASTM A 123.
   6. Fabrication: Fabricate doors and frames to be rigid; neat in appearance; and free from defects, warp, or buckle. Provide continuous welds on exposed joints; grind, dress, and make welds smooth, flush, and invisible.
   7. Finishes: Comply with the following for personnel doors and frames:
      a. Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
         1) Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.
      b. Factory Finish: Apply manufacturer's standard lead- and chromate-free, shop primer and finish coat immediately after surface preparation and pretreatment.

2.13 WINDOWS

A. Aluminum Windows: Aluminum windows shall be WinTech Series 2255 MBS Thermal Fin or equal complying with the following:

1. Performance Requirements: Tested for compliance with requirements in AAMA 101 for air infiltration; water penetration; and structural performance for type, grade, and performance class required.
2. Window Types, Grade, and Performance Class: Provide windows of the following type, grade, and performance class according to AAMA 101:
    a. Horizontal Sliding Units: AAMA Grade and Performance Class HS-C25.
    b. Units to meet RI Energy Code requirements of at least a U-value rating of 0.45 and a SHGC of 0.40.
3. Aluminum Extrusions: 6063-T5, alloy and temper, 0.055-inch thickness at any location for main frame and sash members.
    a. Thermally Improved Construction: Fabricate window units with an integral, concealed, low conductance poured-in-place polyurethane or rigid polyvinylchloride thermal barrier; located between exterior materials and window members exposed on interior; in a manner that eliminates direct metal-to-metal contact.
4. Fasteners: Zinc-plated. Fasteners shall not be exposed, except for attaching hardware.
    a. Reinforcement: Where fasteners screw anchor into aluminum less than 0.125-inch-thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads or provide standard, noncorrosive, pressed-in, splined grommet nuts.
5. Hardware: Manufacturer's standard; of die-cast steel, malleable iron, or bronze; with steel or bronze operating arms, including the following:
    a. Horizontal Slider Units
        1) Painted zinc die-cast sweep latch which mechanically retains the frame meeting rail. Spring-loaded latches shall not be permitted.
        2) Sash roller system shall consist of injection-molded nylon roller housing with brass tire on a stainless-steel axle Nylon or one-piece brass roller-axle assemblies shall not be permitted.
6. Weather Stripping
    a. Horizontal Slider Units: Woven-pile medium density polypropylene pile with Mylar fin, or equal.
7. Insect Screens: Removable insect screen on each operable exterior sash, with screen frame finished to match window unit, and complying with the following:
    a. Glass-Fiber Mesh: 18-by-16 mesh woven and fused to form a fabric mesh, complying with ASTM D 3656.
    b. Frames: Painted roll-formed aluminum.
9. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's specifications for cleaning, conversion coating, and painting.
    a. Organic Coating: Thermosetting, modified-acrylic enamel system complying with AAMA 603.8 except with a minimum dry film thickness of 0.7 mil medium gloss on exposed areas.
10. Glazing: Provide the following glazing materials:
    a. Insulating Glass: Units consisting of two lites of 2-mm-thick clear float glass and air space, Low-E, with a total overall unit thickness of not less than 1 inch. Seal with manufacturer's standard sealant.
    b. Glazing Stops: Snap-on glazing stops, coordinated with window type indicated. Finish shall match color of window units: Horizontal Slider Units: Rigid extruded Polyvinylchloride.

c. Pre-glazed Fabrication: Window units shall be pre-glazed window at the factory.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of metal building system.
   1. For the record, prepare written report, endorsed by Erector, listing conditions detrimental to performance of work.
   2. Proceed with erection only after unsatisfactory conditions have been corrected.

B. Before erection proceeds, survey elevations and locations of concrete and masonry bearing surfaces, base plates, and anchor bolts to receive structural framing. Verify compliance with requirements and metal building system manufacturer's tolerances.
   1. Engage land surveyor to perform surveying.

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease, rolling compounds, incompatible primers, and/or loose mill scale that impair bond of erection materials.

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

3.3 ERECTION

A. Erect metal building system according to Corle's written instructions and erection drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

C. Set structural framing in locations and to elevations indicated and according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Base plates, Leveling Plates, and Bearing Plates: Clean concrete and masonry bearing surfaces of bondreducing materials and roughen surfaces before setting base plates and bearing plates. Clean bottom surface of base plates and bearing plates.
   1. Set base plates and bearing plates for structural members on wedges, shims, or setting nuts.
   2. 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 plate or bearing plate before packing with grout.
   3. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow grout to cure.
      a. Comply with manufacturer's written instructions for proprietary grout materials.

E. Align and adjust framing members before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Make adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

F. Primary Framing and End Walls: Erect framing true to line, level, plumb, rigid, and secure. Level base plates to a true even plane with full bearing to supporting structures and set elevations by installing shims and tightening anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist cure grout for not less than seven days after placement.
1. Make field connections using high-strength bolts. Tighten bolts by turn-of-the-nut method.

G. Secondary Framing: Erect framing true to line, level, plumb, rigid, and secure. Fasten secondary framing to primary framing using bolts indicated on erection drawings. Hold rigidly to a straight-line temporary support until permanent supports, i.e., panel and/or bracing angles, are installed.
1. Provide rake or gable purlins with rake angle and fasciae.
2. Locate canopy framing as indicated.
3. Provide supplemental framing at entire perimeter of openings, including doors, windows,louvers, ventilators, and other penetrations of roof and walls.

H. Steel Joists: Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Standard Specifications, Load Tables, and Weight Tables for Steel Joists and Joist Girders," joist manufacturer's written instructions, and requirements in this Section.
1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists; and plumb and align supporting framing accurately in location before permanently fastening.
3. Install temporary bracing and bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Weld joists to supporting steel framework, unless otherwise indicated.
5. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.

I. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
1. Tighten rod and cable bracing to avoid sag.
2. Locate interior end bay bracing only where indicated.

J. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to building structural frame.

3.4 ROOF PANEL INSTALLATION

A. General: Roof panels of full length from eave to ridge shall be provided when possible. Install panels perpendicular to purlins.
1. Field cutting by torch is not permitted.
2. Rigidly fasten eave end of roof panels and allow ridge end free movement due to thermal expansion and contraction.
3. Provide weather seal under ridge cap.

4. Flash and seal roof panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
5. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes when required by the specified fastener.
6. Locate and space fastenings in true vertical and horizontal alignment.
7. Install ridge caps as roof panel work proceeds.
8. Locate standing seam panel splices and lap seam panel expansion splices over, but not attached to, structural supports.

B. Standing-Seam Roof Panels: Fasten roof panels to purlins with concealed clips at each standing-seam joint. Install clips over top of insulation at each purlin.
1. Install clips to supports with self-drilling fasteners.
2. Crimp standing seams with manufacturer-approved motorized seamer tool so clip, panel, and factory applied side-lap sealant are completely engaged.
3. At panel splices, nest panels with minimum 3-inch end lap, sealed with sealant tape and fastened together by interlocking clamping plates.

3.5 WALL PANEL INSTALLATION

A. General: Wall panels of full height from base to eave or rake shall be provided when possible. Install panels perpendicular to girts.
1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Install panels with vertical edges plumb. Lap ribbed sheets one full rib. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
2. Unless otherwise indicated, begin panel installation at corners with center of rib lined up with line of framing.
3. Field cutting by torch is not permitted.
4. Align bottom of wall panels and fasten with self-tapping screws.
5. Fasten flashing and trim around openings and similar elements with self-tapping screws.
6. When two rows of panels are required, lap panels 8 inches minimum. Locate panel splices over structural supports.
7. When building height requires two rows of panels at gable ends, align lap of gable panels over wall panels at eave height.
8. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes when required by the specified fastener.
9. Provide weather-resistant escutcheons for pipe and conduit penetrating exterior walls.
10. Flash and seal wall panels with weather closures under eaves and rakes, along lower panel edges, and at perimeter of all openings.
11. Apply sealant continuously between metal base channel or sill angle and concrete, and elsewhere as necessary for waterproofing. Handle and apply sealant and backup according to sealant manufacturer's written instructions.
12. Locate and space fastenings in true vertical and horizontal alignment.

B. Exterior Panel: Install wall panels on exterior side of girts. Attach panels to supports with fasteners as indicated in the Corle Building Systems Erection & Detail Manual.

3.6 TRANSLUCENT PANEL INSTALLATION

A. Translucent Panels: Attach plastic panels to structural framing according to Corle Building Systems Erection & Detail Manual.
   1. Provide end laps of not less than 8 inches and side laps of not less than 1½ inches for wall panels.
   2. Align horizontal laps with adjacent wall panels.
   3. Seal intermediate end laps and side laps of translucent panels with sealant tape.

3.7 FASCIA AND SOFFIT PANEL INSTALLATION

A. General: Provide panels full width of fasciae and soffits. Install panels perpendicular to support framing.
   1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Install panels with vertical edges plumb. Lap ribbed panels one full rib corrugation. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
   2. Field cutting by torch is not permitted.
   3. Fasten flashing and trim around openings and similar elements with self-tapping screws.
   4. Install screw fasteners with power tools having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
   5. Locate and space fastenings in true vertical and horizontal alignment.

B. Fascia Panels: Align bottom of panels and fasten with self-tapping screws. Flash and seal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

C. Soffit Panels: Flash and seal panels with weather closures where soffit meets walls and at perimeter of all openings.

3.8 INSULATION INSTALLATION

A. General: Install insulation concurrently with panel installation, according to manufacturer’s written instructions and as follows:
   1. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
   2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

B. Blanket Insulation: Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths with both sets of facing tabs sealed to provide a complete vapor retarder. Comply with the following installation method:

3.9 DOOR INSTALLATION

A. General: Comply with door manufacturer's written instructions for installing doors. Coordinate installation with wall flashings and other components. Seal perimeter of each door frame with sealant used for panels.

B. Personnel Doors and Frames: Install doors and frames straight, level, and plumb. Securely anchor frames to building structure. Set units with maximum 1/8-inch clearance between door and frame at jambs and head and maximum 3/4-inch clearance between door and floor.

C. Replace glass that is broken or damaged to ensure that each piece of exterior glass is airtight and watertight through normal weather/temperature cycles and through normal door operation.

D. Set thresholds for exterior doors in full bed of sealant.

3.10 WINDOW INSTALLATION

A. General: Comply with window manufacturer's written instructions for installing window units, screens, hardware, operators, and other window components. Coordinate installation with wall flashings and other components.

B. Set window units level, plumb, and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.
   1. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in appendix to AAMA 101.

C. Set sill members and other members in a bed of sealant to provide weathertight construction.

D. Anchor windows securely in place. Seal perimeter of each unit with sealant used for panels.

E. Glazing: Replace glass that is broken or damaged to ensure that each piece of exterior glass is airtight and watertight through normal weather/temperature cycles and through normal window operation.

3.11 ACCESSORY INSTALLATION

A. General: Install gutters, downspouts, ventilators, louvers, and other accessories according to Corle Building Systems Erection & Detail Manual, with positive anchorage to building and weathertight mounting. Coordinate installation with flashings and other components.

B. Flashing and Trim: Comply with performance requirements, Corle Building Systems Erection & Detail Manual, and SMACNA's "Architectural Sheet Metal Manual." Provide for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

C. Gutters: Join sections with lapped and riveted joints. Attach gutters to eave with gutter hangers spaced not more than 2 feet o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant.

D. Downspouts: Join sections with 1½-inch telescoping joints. Provide fasteners designed to hold downspouts securely away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c. in between.
   1. Provide elbow at base of downspout to direct water away from building.
   2. Tie downspouts to underground drainage system.

E. Continuous Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports according to manufacturer's written instructions. Join sections with splice plates and end-cap skirt assemblies where required to achieve indicated length. Install preformed filler strips at base to seal ventilator to roof panels.

F. Louvers: Set louvers complete with necessary hardware, anchors, dampers, weather guards, and equipment supports according to manufacturer's written instructions. Locate and place louver units' level, plumb, and at indicated alignment with adjacent work.

3.12 ERECTION AND LOCATION TOLERANCES

A. Structural-Steel Erection Tolerances: Comply with erection tolerance limits of AISC Code of Standard Practice for Steel Buildings and Bridges, 2005, except individual members are considered plumb, level, and aligned if the deviation does not exceed 1:300; and MBMA 2006 Metal Building Systems Manual.

B. Roof Panel Installation Tolerances: Shim and align units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Wall Panel Installation Tolerances: Shim and align units within installed tolerance of 1/4 inch in 20 feet on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

D. Door Installation Tolerances: Fit doors in frames within clearances specified in SDI 100.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing agency to perform field quality- control testing.

B. Extent and Testing Methodology: Testing and verification procedures will be required of high-strength bolted connections.
   1. Bolted connections will be visually inspected.
   2. High-strength, field-bolted connections will be tested and verified according to procedures in RCSC's "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Testing agency will report test results promptly and in writing to Erector, Contractor, and Architect.

3.14 ADJUSTING

A. Doors: After completing installation, lubricate, test, and adjust doors to operate easily, free from warp, twist, or distortion.

B. Hardware: Adjust and check each operating item of hardware to ensure proper operation and function. Replace units that cannot be adjusted to operate freely and smoothly.
   1. Where door hardware is installed more than one month before acceptance or occupancy, make final check and adjustment of hardware items during the week before acceptance or occupancy. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Windows: Adjust operating ventilators and hardware to provide a tight fit at contact points and weather stripping, for smooth operation and a weathertight closure.

D. Ventilators and Louvers: After completing installation, including work by other trades, lubricate, test, and adjust units to operate easily, free from warp, twist, or distortion.
   1. Adjust louver blades to be weathertight when in closed position.

3.15 CLEANING AND PROTECTION

A. Touchup Painting: Immediately after erection, clean, prepare, and prime or reprime welds, bolted connections, and abraded surfaces of prime-painted primary, accessories, and bearing plates.
   1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
   2. Apply compatible primer of same type as shop primer used on adjacent surfaces.

B. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and paint manufacturer's written instructions.

C. Roof and Wall Panels: On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.
   1. Replace panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

D. Doors: Immediately after erection, sand smooth any rusted or damaged areas of factory paint and apply touchup of compatible air-drying primer and/or finish coat.

E. Windows: Clean metal surfaces promptly after installing windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts. Clean glass promptly after installing windows.

END OF SECTION

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SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS (Read these DIVISIONS carefully. For purposes of bidding, assume that all work of the DIVISION referenced is to be performed under that DIVISION unless specifically indicated therein to be performed under the ELECTRICAL DIVISION. Coordinate with all divisions to ensure a complete installation)

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

B. Temporary wiring for building construction - see DIVISION 1.

C. Cutting and patching - see DIVISION 17

D. Allowances – see DIVISION 1.

E. Alternatives - see DIVISION 1.

F. Excavation and backfilling - see DIVISION 31.

1.2 SUMMARY

A. Section Includes:
1. Work that applies to all sections of DIVISION 26.
2. Temporary electrical wiring.
3. Interruption of existing electric service.
4. Electrical equipment coordination and installation.
5. Sleeves for raceways and cables.
6. Sleeve seals.
7. Grout.
8. Common electrical installation requirements.
9. Removals (demolition) and relocations

1.3 DEFINITIONS

A. Provide: Furnish and install.

B. Wiring: Wire, raceways, boxes and fittings.

C. EPDM: Ethylene-propylene-diene-terpolymer rubber.

D. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Do all wiring and provide all equipment in accordance with the prevailing issue of the National Electrical Code, State Building Code, State Fire Code, OSHA and any additional local rules or requirements.

C. Obtain and pay for all necessary permits, certificates, etc. Present satisfactory proof of final inspection and approval by all inspection authorities.

D. Consider the following Industry Standards as minimum requirements for all materials, equipment and systems where such standards are established for materials in question:

1. National Board of Fire Underwriters
2. National Electrical Manufacturers Association
3. National Fire Protection Association
4. Institute of Electrical and Electronic Engineers
5. Local Electric Utility Company
6. Local Telephone Company
7. A nationally recognized testing laboratory (UL, ETL, etc.)
8. Factory Mutual
9. Americans with Disabilities Act

E. Where applicable, this installation shall comply with the following NECA (National Electrical Contractors Association) "National Electrical Installation Standards." Except, if there is a conflict between this specification and these standards, the requirements of this specification shall prevail.

1. NECA 1-2000 Standard Practices for Good Workmanship in Electrical Contracting

2. NECA 101-2001 Standard for Installing Steel Conduit (Rigid, EMT)

1.6 PROJECT CONDITIONS

A. Interruption of Existing Services: All shutdowns of services (power, fire alarm, telephone, etc.) must be approved in writing by the Owner. Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify **Construction Manager and Owner** no fewer than **seven** days in advance of proposed interruption of electric service.

B. Comply with NFPA 70E.

1.7 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

1.8 TEMPORARY ELECTRICAL WIRING: (Extended from existing building)

A. Provide temporary electrical wiring of power and lighting for construction.

B. Extend service from the electrical system of the existing building.

C. The Owner to pay the cost of energy consumed.

D. Service to be 120/240 volts, single phase, 3 wire.

E. Provide all required connections, panels, circuit breakers, feeders, branch circuit wiring, lighting fixtures, lamps, receptacles, switches, etc. for a complete and operating temporary electrical system.

F. Provide a minimum of 10 footcandles of temporary general illumination throughout the floor area of the building, including all corridors and stairways.

G. Provide feeders of sufficient capacity for the requirements of the work, sufficient number of outlets conveniently located so that extension cords not exceeding 100 feet will reach all work requiring artificial light or power.

H. All receptacles must be GFCI protected and the entire installation must comply with all applicable OSHA requirements.

I. At the end of the day's work, disconnect all lights and power.

J. Provide replacement light bulbs and maintenance of the temporary wiring system, as required, throughout the period of construction.

K. Conform to all codes and regulations.

L. Completely remove temporary wiring system upon completion of construction.

1.9 CHANGE ORDERS/PROPOSAL REQUESTS:

A. During the course of construction, changes in the work may occur. When a significant change is to be made, a Proposal Request will be issued.

B. Provide a complete cost breakdown when responding to each Proposal Request.

C. Each item of work to be priced separately.

D. Each line item to be broken down including quantities and listing separately labor and material.

E. Both credits and extras shall be separately and clearly quantified.

F. Allowances for overhead and profit shall be as listed in the supplementary conditions.

G. If you become aware of a field condition, code requirement, error, or omission that you feel should result in a change to the work, please contact the Engineer for discussion. The Engineer may be able to clarify the situation and avoid unnecessary paperwork.

H. It is recognized that the Owner benefits when the construction process is a cooperative effort instead of an adversarial relationship. Reasonable give-and-take allows the construction process to move smoothly. Your efforts in this regard will be appreciated by all parties.

1.10 INSPECTIONS/SITE OBSERVATIONS

A. The authority having jurisdiction (usually the Municipal Electrical Inspector) shall be notified at periodic intervals that an inspection is requested.

B. Do not cover the work before the Engineer has had a chance to observe it in completed form. The electrical foreman shall request a meeting with the Engineer within 10 days after the start of electrical construction to assure that there is agreement on the scope of work and to answer questions.

C. The electrical foreman shall provide assistance to the Engineer during site observations:

1. Describe the progress of the electrical work in detail.
2. Accompany the Engineer on his tour of the site, upon request.
3. Provide use of project drawings, specifications and shop drawings.

1.11 GUARANTEES/WARRANTIES:

A. See other portions of the Project Manual for details on Guarantees and Warranties. However, minimum shall be one year from date of acceptance by the Engineer.

B. The Owner reserves the right to make appropriate modifications or extensions of systems and equipment furnished under this contract during the guarantee/warranty period without "voiding" or modifying the guarantee/warranty of equipment and wiring installed under this contract. If manufacturer voids guarantee, it shall not relieve this contractor of his responsibilities for guarantee/warranty period.

1.12 MISCELLANEOUS

A. Provide all systems complete. Drawings and Specifications form complementary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both.

B. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for a sound, secure and complete installation.

C. All wiring and connections shall be executed with associated circuit de-energized.

PART 2 - PRODUCTS

2.1 MATERIALS - General:

A. All materials and equipment shall be new unless specifically stated otherwise.

B. Materials and equipment shall be suitable for their intended use and for the environment in which they are installed. For example, equipment located outside shall be weatherproof and constructed of materials that will not rust. This includes brackets, screws, etc.

C. Coordinate all dimensions to make sure that boxes, raceways, equipment, fixtures, etc., fit properly in the finished construction. If special provisions, such as shallow boxes, are required, they shall be provided at no increase in contract price, regardless of catalog numbers listed in contract documents or on shop drawings.

D. As it is not practical to enumerate in these specifications (or show on the drawings) all details of fittings and accessory equipment required for proper operation of the various electrical systems herein described, it is understood that they will be supplied without extra compensation. Provide all fittings, terminations, relays, components of panels and equipment, etc., needed for the best performance possible at the present state-of-the-art.

2.2 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

2.3 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
   a. Tyco/RayChem.
   b. Advance Products & Systems, Inc.
   c. Calpico, Inc.
   d. Metraflex Co.
   e. Pipeline Seal and Insulator, Inc.
   f. Equal approved by Engineer.

2.4 GROUT

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

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

D. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

E. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

F. Right of Way: Give to piping systems installed at a required slope.

G. Record of Addenda and Change Orders: To avoid overlooking addenda and change order modifications, mark all changes on all copies of drawings and specifications, in a manor acceptable to the Engineer. One method of accomplishing this is to make copies and tape them on the back of the preceding page (tape all edges). Also, circle the changed area and note: see addenda #1, etc. If whole pages or sheets change, either remove the superseded document or put a bold **"X"** through it.

H. Record Drawings: Owner's record drawings shall be updated as the project progresses. Maintain documents in a safe, dry location. Indicate clearly and accurately any changes necessitated by field conditions and dimension all raceways built into or under concrete slabs or buried under ground. Contractor to prepare as-built drawings in CAD format at contractor's expense. Contract drawings in CAD format to be furnished to contractor at no cost to contractor. Contractor to provide two compact discs and two hard copies of final as-built drawings.

I. Letter of Confirmation: Include in the above manuals a letter confirming that the following items have been completed. Provide written receipt signed by the Owner or his representative indicating that the first 4 items listed below have been received.

1. The number of circuit breaker locks called for have been provided.
2. Keys have been provided for all locked electrical equipment.
3. Spare fuses have been provided.

3.2 SEQUENCE AND BALANCE:

A. Maintain correct phase sequence of all feeders and circuits by establishing phase identification and maintaining correct relationship throughout the system. Provide line balance within 10% of normal loads.

3.3 LAYOUTS

A. The electrical system layouts indicated are generally diagrammatic and locations of outlets and equipment are approximate only; govern exact routing of wiring and locations of outlets and equipment by structural conditions and obstructions. This is not to be construed to permit redesigning systems. Interconnect as shown.

B. Locate all equipment requiring maintenance and operation so that it will be readily accessible. The right is reserved to make any reasonable change in location of outlets and equipment prior to roughing-in without involving additional expense. This may involve slightly longer wiring runs, longer stems, additional mounting provisions, etc. Allow for this in your bid because additional compensation will not be provided. Items not specifically located on the plans shall (for the purposes of bidding) be assumed to be in the farthest, most difficult location. Exact location to be as directed in the field.

3.4 ELECTRICAL SERVICE: (Existing)

A. Extend electrical service shall from existing buiding.

1. Service voltage is 120/240 volts, single phase, three wire.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel or cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

3.6 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.7 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07.

B. Penetrations through exterior surfaces shall be made watertight.

3.8 WORK INTERFERING WITH EXISTING WIRING:

A. Make any necessary re-circuiting, extensions of existing circuits and relocations required to properly re-energize remaining existing devices or equipment that may be interfered with by new construction or removals.

3.9 REMOVALS (DEMOLITION) AND RELOCATIONS:

A. Coordinate with DIVISION 2 section “Selective Demolition.”

B. Do all removal work in a neat and orderly manner so as not to endanger lives nor cause damage. Removal work to include all associated hangers, couplings, supports, raceway and wiring, etc., and shall be complete in every way.

C. Remove and dispose of, off-site in a legal manner, all raceways and wire indicated to be removed.

D. Prior to removing any electrical equipment, properly de-energize all associated wiring. Remove wires from terminals of supply switches or circuit breakers.

3.10 CUTTING AND PATCHING

A. This trade (specification section) is responsible for its respective cutting and patching.

B. Do not endanger any work by cutting or altering work or any part of it.

C. Prior to cutting which affects structural safety of project, or work of another Contractor, submit written notice to the Engineer, requesting consent to proceed with cutting.

END OF SECTION 26 05 00

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600V-COPPER ONLY)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Specification Section 260500 Common Work Results For Electrical.

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

B. Related Sections include the following:

1. Division 26 Section "Medium-Voltage Cables" for single-conductor and multiconductor cables, cable splices, and terminations for electrical distribution systems with 2001 to 35,000 V.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

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

B. Qualification Data: For testing agency.

C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

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. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.
3. General Cable Corporation.
4. Southwire Company.
5. Equal approved by Engineer.

B. All conductors, insulation, and cables shall comply with NEMA WC 70.

C. Conductor Material: Copper complying with NEMA WC 5 solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

D. Conductor Insulation Types: Type THHN-THWN or XHHW complying with NEMA WC 5.

E. Multiconductor Cable: Metal-clad cable, Type MC.

2.2 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.
6. Equal approved by Engineer.

B. Description: Spring-type factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

C. Do not use push-in type wire connectors, use spring type instead.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway, Type XHHW, single conductors in raceway, or, Type SE or USE multiconductor cable. See One-Line Diagram.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway, or Mineral-insulated, metal-sheathed cable, Type MI.

C. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

3.3 CONNECTIONS

A. Make all final connections required for a complete and fully operational facility.

B. Wiring connections to equipment shall include connections to all accessories. For example, if a fan has an associated damper, the wiring must be extended from the fan to the damper at no additional charge. Another example is interconnection of equipment. Some items of equipment consist of several pieces, which must be interconnected before connecting to the circuit. No additional compensation will be paid for interconnections.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

D. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

E. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

F. Locations of junction boxes, stub-ups and disconnects are diagrammatic. At the time of design, the exact brand of equipment is usually not known. Therefore, the exact locations of connections are not known. For the purposes of bidding assume the worst, farthest locations. During construction, coordinate connections with final approved shop drawings and coordinate with other trades. Conform to manufactures written installation instructions. Provide working space in compliance with code.

3.4 FIELD QUALITY CONTROL

A. All cables installed under this contract are to be protected from damage prior to installation, during installation, and after installation. Store cable in a dry area protected from physical damage. Before installing cable, raceway shall be clear, dry and free from burs or sharp edges. When cables pass through metal partitions, provide permanently installed insulating bushings; this applies to all cables installed under this contract (systems, communications, etc.). Insulated bushings are to be installed prior to pulling in of cable. Cables shall be installed back from edge of studs as required by Code.

END OF SECTION 26 05 19

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SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:
   1. Underground distribution grounding.
   2. Common ground bonding with lightning protection system.

1.3 SUBMITTALS

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

B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:

   1. Test wells.
   2. Ground rods.
   3. Ground rings.
   4. Grounding arrangements and connections for separately derived systems.
   5. Grounding for sensitive electronic equipment.

C. Qualification Data: For testing agency and testing agency's field supervisor.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:

   1. Instructions for periodic testing and inspection of grounding features at test wells, ground rings, and grounding connections for separately derived systems, based on NETA MTS.

      a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
      b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable, insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Bare Grounding Conductor and Conductor Protector for Wood Poles:

1. No. 4 AWG minimum, soft-drawn copper.
2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.

D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches (6 by 50 mm) in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel, sectional type; 5/8 in diameter by 96 inches (16 by 2400 mm).

B. Chemical-Enhanced Grounding Electrodes: Copper tube, straight or L-shaped, charged with nonhazardous electrolytic chemical salts.

1. Termination: Factory-attached No. 4/0 AWG bare conductor at least 48 inches (1200 mm) long.
2. Backfill Material: Electrode manufacturer's recommended material.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 3/0 WG minimum.

1. Bury at least 24 inches (600 mm) below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install as indicated on plans.

1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

G. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

H. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized the same as the system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
2. For grounding electrode system, install at least three rods (or ufer and two rods) spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.

1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

I. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of building.

1. Install bare copper conductor not less than No. 4/0 AWG for ground ring and for taps to building steel.
2. Bury ground ring not less than 24 inches (600 mm) from building foundation.

J. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 1/0 AWG.

1. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within base of foundation.
2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.

   a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
   b. Perform tests by fall-of-potential method according to IEEE 81.

3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohms.
5. Substations and Pad-Mounted Equipment: 5 ohms.
6. Manhole Grounds: 10 ohms.

C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

B. Related Sections include the following:

1. Division 26 Section "Vibration and Seismic Controls For Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:
1. Metallic slotted support systems.

2. Nonmetallic slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

C. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Flange edges turned toward web, and 9/16-inch- (14-mm-) diameter slotted holes at a maximum of 2 inches (50 mm) o.c., in webs. Strength rating to suit structural loading. Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.
h. Equal approved by Engineer.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.

4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
5. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c., in at least 1 surface.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

   a. Allied Tube & Conduit.
   b. Cooper B-Line, Inc.; a division of Cooper Industries.
   c. Fabco Plastics Wholesale Limited.
   d. Seasafe, Inc.
   e. Equal approved by Engineer.

2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
4. Rated Strength: Selected to suit applicable load criteria.

C. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers. As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron with hot-dip galvanized finish..

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

      1) Hilti Inc.
      2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

3) MKT Fastening, LLC.
4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
5) Equal approved by Engineer.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1) Cooper B-Line, Inc.; a division of Cooper Industries.
2) Empire Tool and Manufacturing Co., Inc.
3) Hilti Inc.
4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
5) MKT Fastening, LLC.
6) Equal approved by Engineer.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems, except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Support individual horizontal single raceways with separate, malleable-iron pipe hangers or clamps except use spring-steel fasteners for 1-1/2-inch (38-mm) and smaller single raceways above suspended ceilings and for fastening raceways to slotted channel and angle supports.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

D. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

E. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads (+25 percent minimum) within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

F. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts, or beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
9. Fasteners: Select so load applied to each fastener does not exceed 25 percent of its proof-test load.

G. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete (Limited Applications)."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:

1. Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

J. RGS: Rigid galvanized steel conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways, fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.
2. For handholes and boxes for underground wiring, including the following:

    a. Duct entry provisions, including locations and duct sizes.
    b. Frame and cover design.
    c. Grounding details.
    d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
    e. Joint details.

C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members in the paths of conduit groups with common supports.
2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.

D. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

    a. The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will retain its enclosure characteristics, including its interior accessibility, after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Qualification Data: For professional engineer and testing agency.

F. Source quality-control test reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.
10. Equal approved by Engineer.

B. Rigid Steel Conduit: ANSI C80.1.

C. Aluminum Rigid Conduit: ANSI C80.5.

D. IMC: ANSI C80.6.

E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch (1 mm), minimum.

F. EMT: ANSI C80.3.

G. FMC: Zinc-coated steel.

H. LFMC: Flexible steel conduit with PVC jacket.

I. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: Steel, set-screw type.
3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

J. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

A. 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. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.; Pipe & Plastics Group.

6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.
13. Equal approved by Engineer.

B. ENT: NEMA TC 13.

C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

D. LFNC: UL 1660.

E. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

F. Fittings for LFNC: UL 514B.

2.3 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. Arnco Corporation.
2. Endot Industries Inc.
3. IPEX Inc.
4. Lamson & Sessions; Carlon Electrical Products.
5. Equal approved by Engineer.

B. Description: Comply with UL 2024; flexible type, approved for plenum, riser, or general-use installation, as needed.

2.4 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

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

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.
4. Equal approved by Engineer.

C. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, 12, or 3R, as indicated or required by environmental conditions.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

E. Wireway Covers: Hinged type, screw-cover type, or flanged-and-gasketed type, as indicated.

F. Finish: Manufacturer's standard enamel finish.

2.5 NONMETALLIC WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. Hoffman.
2. Lamson & Sessions; Carlon Electrical Products.
3. Equal approved by Engineer.

B. Description: Fiberglass polyester, extruded and fabricated to size and shape indicated, with no holes or knockouts. Cover is gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections are flanged, with stainless-steel screws and oil-resistant gaskets.

C. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.6 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.

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. Thomas & Betts Corporation.
b. Walker Systems, Inc.; Wiremold Company (The).
c. Wiremold Company (The); Electrical Sales Division.
d. Equal approved by Engineer.

2.7 BOXES, ENCLOSURES, AND CABINETS

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. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.

10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
14. Equal approved by Engineer.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Metal Floor Boxes: Cast metal, fully adjustable, rectangular.

F. Nonmetallic Floor Boxes: Nonadjustable, round.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

I. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

J. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.8 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Description: Comply with SCTE 77.

1. Color of Frame and Cover: Green.
2. Configuration: Units shall be designed for flush burial and have open bottom, unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, as indicated for each service.
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
7. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

a. Armorcast Products Company.
b. Carson Industries LLC.
c. CDR Systems Corporation.
d. NewBasis.
e. Equal approved by Engineer.

2.9 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section on penetration firestopping.

2.10 SLEEVE SEALS
1. See Section 260500.

2.11 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by an independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.
2. Concealed Conduit, Aboveground: EMT.
3. Underground Conduit, over 600 volts: RNC, Type EPC-80-PVC, direct buried.
4. Underground Conduit, under 600 volts: RNC, Type EPC-40-PVC, direct buried.

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): In dry conditions, use FMC. Use LFMC in damp, wet, or dirty conditions.
6. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or 4, as indicated.
7. Application of Handholes and Boxes for Underground Wiring:

    a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
    b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer-concrete units, SCTE 77, Tier 8 structural load rating.
    c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf (13 345-N) vertical loading.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed and Subject to Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.
    d. Per drawings.

3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp, wet, or dirty locations.
5. Damp or Wet Locations: Rigid steel conduit.
6. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: EMT.
7. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: EMT.
8. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: EMT.
9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in corrosive locations.

C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 12 inches (300 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded in Slabs:

1. Run conduit larger than 2-inch (54-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles; with expansion fittings.
3. Change from Type EPC-40-PVC, to rigid steel conduit before rising above the floor.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors of all sizes.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch (19-mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).
2. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated or heated spaces.
2. Where otherwise required by NFPA 70.

N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m).

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
   c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
   d. Attics: 135 deg F (75 deg C) temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

O. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject.

P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

Q. Set metal floor boxes level and flush with finished floor surface.

R. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches (150 mm) in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."

3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

5. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of conduit.

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.

D. Install handholes and boxes with bottom below the frost line; or 40 inches below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. See Section 260500.

3.6 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.

1.3 DEFINITIONS

A. SVR: Suppressed voltage rating.

B. TVSS: Transient voltage surge suppressor.

1.4 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.5 SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.

8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
9. When used as "service Entrance Equipment", it is the Contractor's responsibility to submit all shop drawings to the local power company and electrical inspector and obtain their approval (including main circuit breakers characteristics) prior to fabrication.

C. Qualification Data: For qualified testing agency.

D. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

F. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

G. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NEMA PB 1.

F. Comply with NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.8 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

   a. Ambient Temperature: Not exceeding minus 5 deg C to plus 104 deg F (plus 40 deg C).
   b. Altitude: Not exceeding 6600 feet (2000 m).

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

1.9 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. If freestanding, coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

1.11 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Two spares for each type of panelboard cabinet lock.
2. Circuit Breakers Including GFCI and Ground Fault Equipment Protection (GFEP) Types: Two spares for each panelboard.
3. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
4. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

B. Enclosures: Flush- and surface-mounted cabinets, per plans.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
b. Outdoor Locations: NEMA 250, Type 3R.
c. Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.
f. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

2. Door-In-Trim: Provide with piano hinge on left side of trim, so that trim (and door) can be swung open for easy access to wiring terminals (rather than removed).
3. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
4. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
5. Finishes:

a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
b. Back Boxes: Galvanized steel, or same finish as panels and trim.
c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.

6. Directory Card: Inside panelboard door, typewritten, mounted in transparent card holder.

7. Equip door with spring latch and tumbler-lock with all locks keyed alike.

C. Phase, Neutral, and Ground Buses:

1. Material: Tin-plated aluminum.
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
3. Isolated Ground Bus, where indicated on plans: Adequate for branch-circuit isolated ground conductors; insulated from box.
4. Extra-Capacity Neutral Bus, where indicated on plans: Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.
5. Split Bus, where indicated on plans: Vertical buses divided into individual vertical sections.

D. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Tin-plated aluminum.
2. Main and Neutral Lugs: Mechanical type.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type.
4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
6. Gutter-Tap Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
7. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.
8. Suitable for use with conductor material

E. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.

F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

G. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.

H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 DISTRIBUTION PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, power and feeder distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.

D. Mains: Circuit breaker, fused switch, or lugs only. See drawings.

E. All branch Overcurrent Protective Devices: Bolt-on circuit breakers.

F. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.

1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
2. External Control-Power Source: 120-V branch circuit or 24-V control circuit, coordinated with control specific control system.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker or lugs only, per drawings.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.

1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
2. External Control-Power Source: 120-V branch circuit or 24-V control circuit.

F. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

G. Circuit Breaker Locks: Provide thirty (30).

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Per section 262816 Enclosed Switches and Circuit Breakers.

2.5 PANELBOARD SUPPRESSORS

A. See Section 264313/2.2.

2.6 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Floor mounted panelboards: Install panelboards on concrete bases, 4-inch (100-mm) nominal thickness. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-Place Concrete"

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.
2. Install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to panelboards.
5. Attach panelboard to the vertical finished or structural surface behind the panelboard. Where there is no surface, provide a structural steel rack.

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

D. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

E. Mount panelboard cabinet plumb and rigid without distortion of box.

F. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

G. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

H. Install filler plates in unused spaces.

I. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

J. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

K. Comply with NECA 1.

L. Mount top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.

M. Re-Torque: Once in final location, carefully re-torque all connections with a torque wrench, to match manufacturers recommendations. If equipment is dismantled, it must be re-inspected and re-certified by a nationally recognized testing laboratory, acceptable to the Engineer and the Authority Having Jurisdiction.

N. Aluminum Cable Connections: If aluminum wire is permitted in Division 26, section “Conductors and Cables”, circumferential compression type lugs are required for all terminations on aluminum wire. Where screw type lugs are used, it will be necessary to convert from aluminum to copper wiring before connection. This can be done by use of T & B or Ilsco, compression connectors. Adequate wiring space must be provided for connectors, if used.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Division 26 Section "Power System Studies."

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as security and data equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.6 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

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SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Wall-box motion sensors.
4. Snap switches and wall-box dimmers.
5. Solid-state fan speed controls.
6. Wall-switch sensors.
7. Pendant cord-connector devices.
8. Cord and plug sets.
9. Service poles and multioutlet assemblies.
10. Device trim plates.
11. Emergency lighting relays.

B. Related Sections include the following:

1. Division 27 Section "Communications Horizontal Cabling" for workstation outlets.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

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

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

D. Field quality-control test reports.

E. Operation and Maintenance Data: Include all manufacturers' packing label warnings and instruction manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

B. Provide additional receptacles to suit the particular equipment served.

C. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Wiring Devices:
   a. General Electric Company
   b. Bryant Electric, Inc./Hubbell Subsidiary.
   c. Hubbell Incorporated; Wiring Device-Kellems.
   d. Leviton Mfg. Company Inc.
   e. Pass & Seymour/Legrand; Wiring Devices Div.
   f. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper)

2. Multioutlet Assemblies:

   a. Hubbell Incorporated; Wiring Device-Kellems.
   b. Wiremold Company (The).
   c. Equal approved by Engineer.

3. Poke-Through, Floor Service Outlets and Telephone/Power Poles:
   a. Hubbell Incorporated; Wiring Device-Kellems.

b. Pass & Seymour/Legrand; Wiring Devices Div.
c. Thomas & Betts Corporation.
d. Wiremold Company (The).
e. Equal approved by Engineer.

2.2 RECEPTACLES

A. General
1. Comply with NEMA WD 1, NEMA WD 6, and UL 498.
2. Provide additional receptacles to suit the particular equipment served.
3. Provide other special duty receptacles as indicated on the drawings.
4. Receptacles mounted outdoors or in other wet or damp locations shall be GFI type and installed in weatherproof enclosures, the integrity of which is not affected when the receptacle is in use (attachment plug cap inserted). Also comply with UL 943, Class A, and include indicator light that is lighted when device is tripped.
5. Color as selected by Architect, or as noted.
6. Catalog numbers are for General Electric Company, or as noted.
7. Isolated-Ground, Duplex Convenience Receptacles: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

B. Provide 20 amp. commercial specification grade, grounded, DUPLEX RECEPTACLES.

20A/125V	Duplex Receptacle	GE #GCR-20
20A/125V	Single Receptacle	GE #4102
30A/125V/250V	4 Wire Receptacle	GE #1439-3
50A/125V/250V	4 Wire Receptacle	GE #4181-3
20A/125V	Duplex Receptacle	GE #5362-IG (Isolated Ground)
20A/125V	Single Receptacle	GE #4102-IG (Isolated Ground)
20A/125V	GFI Dup. Rec.	GE #GFR 5342

C. Provide Wiring Devices for HAZARDOUS (Classified) Locations: Comply with NEMA FB 11 and UL 1010.

D. Provide TWIST-LOCKING RECEPTACLES: Provide single convenience receptacles where indicated.

E. Provide heavy-duty grade PENDANT CORD-CONNECTOR DEVICES.

1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.
2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

F. Provide CORD AND PLUG SETS
1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.3 SWITCHES

A. GENERAL
1. Comply with NEMA WD 1 and UL 20.

B. Provide 20 amp., toggle type, "Federal Specification Grade" lighting switches.

Single pole	GE #5951	Three-way	GE #5953
Double pole	GE #5952	Four-way	GE #5954

C. Provide heavy duty, specification grade, 20 amp., quiet "AC", "DECORA" TOUCH SWITCHES. Catalog numbers are for Slater Medalist Decora Series.

Single pole	2770	Three-way	2773
Double pole	2772	Four-way	2774

D. Provide Pilot Light Switches, 20 A, single pole, with neon-lighted handle, illuminated when switch is "ON."

E. Provide Key-Operated Switches, 120/277 V, 20 A, Single pole, with factory-supplied key in lieu of switch handle.

F. Provide Key-Operated, Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

G. Provide FAN SPEED CONTROLS: Modular, 120-V, full-wave, solid-state units with integral, quiet on-off switches and audible frequency and EMI/RFI filters. Comply with UL 1917.
1. Continuously adjustable rotary knob, 5 A.

H. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible frequency and EMI/RFI filters, unless otherwise indicated on the drawings.

1. Control: Continuously adjustable combination slider and toggle switch with single-pole or three-way switching to suit connections. Comply with UL 1472.

I. Occupancy Sensors
1. As indicated on the drawings.

J. Wall-Switch Sensors:
1. As indicated on the drawings.

K. Emergency Lighting Relays
1. Provide relays in emergency lighting circuits to cause emergency lights to automatically light whenever the emergency transfer switch goes to the emergency position, regardless of the position of the local switch.

2. Provide SPDT transfer relays in NEMA #1 enclosure above accessible suspended ceiling or flush mounted adjacent to lighting panel. Provide one relay for each switch. Provide holding coils rated for continuous operation with 120 ampere contacts. Wire as indicated on the drawings or as directed

2.4 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Smooth, high-impact thermoplastic.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, polycarbonate with lockable cover.

C. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Provide smooth (unribbed) high-impact thermoplastic switch and receptacle cover plates. Color as selected by Architect.
3. Receptacles mounted outdoors or in other wet or damp locations shall be installed in weatherproof enclosures with key lock cover, the integrity of which is not affected when the receptacle is in use (attachment plug cap inserted).

2.5 MULTIOUTLET ASSEMBLIES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:

1. Hubbell Incorporated; Wiring Device-Kellems.
2. Wiremold Company (The).
3. Panduit Corp.
4. Equal approved by Engineer.

B. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.

C. Raceway Material: Metal, with manufacturer's standard finish.

2.6 SERVICE POLES

A. Description: Factory-assembled and -wired units to extend power and voice and data communication from distribution wiring concealed in ceiling to devices, connections, or outlets in pole near floor.

1. Poles: Nominal 2.5-inch- (65-mm-) square cross section, with height adequate to extend from floor to at least 6 inches (150 mm) above ceiling, and with separate channels for power wiring and voice and data communication cabling.
2. Mounting: Ceiling trim flange with concealed bracing arranged for positive connection to ceiling supports; with pole foot and carpet pad attachment.
3. Finishes: Manufacturer's standard painted finish and trim combination.
4. Wiring: Sized for minimum of five No. 12 AWG power and ground conductors and a minimum of four, 4-pair, Category 3 or 5 voice and data communication cables.
5. Power Receptacles: Two duplex, 20-A, heavy-duty, NEMA WD 6 configuration 5-20R units.
6. Voice and Data Communication Outlets: Provide type as indicated on the drawings or as directed.

2.7 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices Connected to Normal Power System: As selected by Architect, unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

a. Cut back and pigtail, or replace all damaged conductors.
b. Straighten conductors that remain and remove corrosion and foreign matter.
c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
10. Install devices and assemblies level, plumb, and square with building lines.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening. Remove wall plates and protect devices and assemblies during painting.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers.
4. Install wall dimmers to achieve indicated rating after derating for ganging.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings. Obtain approval of adjustments from Architect/Engineer prior to installation.

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes. Brother P-Touch Labeling System is acceptable, in lieu of engraving.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.
   1. Test Instruments: Use instruments that comply with UL 1436.
   2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

   1. Line Voltage: Acceptable range is 105 to 132 V.
   2. Percent Voltage Drop under 15-A Load: A value of 3 percent or higher is not acceptable.
   3. Ground Impedance: Values of up to 2 ohms are acceptable.
   4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
   5. Using the test plug, verify that the device and its outlet box are securely mounted.
   6. The tests shall be diagnostic, indicating proper polarity, damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION 262726

SECTION 26 50 00

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior lighting fixtures with LED sources.
2. Lighting fixtures mounted on exterior building surfaces with LED sources.
3. Accessories, fasteners, etc.

1.2 RELATED DOCUMENTS:

A. The General Conditions, Supplementary Conditions, and applicable portions of Division 1 of the specification are part of this section which shall consist of all labor, equipment, materials and other costs necessary to complete all INTERIOR LIGHTING work indicated on the drawings, herein specified or both.

B. The applicable portions of section 260500 General are hereby make a part of this section. It is important that you read that section carefully because it expands upon the requirements herein.

1.3 SUBMITTALS

A. Product Data: For each type of lighting fixture scheduled, arranged in order of fixture designation. Include data on features, accessories, and finishes.

B. Shop Drawings: Show details of nonstandard or custom fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories.

C. Operation and maintenance data.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

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, products specified.

2.2 LIGHTING LUMINAIRES

A. See schedules on drawings.

B. LED Luminaires shall meet all DesignLights Consortium® (DesignLights.org) Product Qualification Criteria. This does not require that the luminaire be listed on the DesignLights Consortium's® Qualified Products List, but they must meet the Product Qualification Criteria. The technical requirements that the luminaire shall meet for each Application Category as currently defined by the DLC Premium qualification requirements at the time of bid.

C. Color Temperature of 3000K-4100K for interior luminaires as listed in the Luminaire Schedule on the plans. The color temperature of exterior LED luminaires should not exceed 4100K (nominal).

D. Color Consistency: LED manufacturer shall use a maximum 3-step MacAdam Ellipse binning process to achieve consistent luminaire-to-luminaire color for interior luminaires. Exterior luminaires shall use a maximum 5-step MacAdam Ellipse binning process.

E. Glare Control: Exterior luminaires shall meet DesignLights Consortium's® criteria for Zonal Lumen Distribution requirements or Backlight-Uplight-Glare (BUG) standards for exterior luminaires.

F. Luminaire shall be mercury-free, lead-free, and RoHS compliant.

G. Luminaire shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

H. Light output of the LED system shall be measured using the absolute photometry method following IES LM-79 and IES LM-80 requirements and guidelines.

I. Luminaire shall maintain 70% lumen output (L70) for a minimum of 50,000 hours.

J. Driver shall have a rated life of 50,000 hours, minimum.

K. Lumen output shall not depreciate more than 20% after 10,000 hours of use.

L. Driver and LEDs shall be furnished from a single manufacturer to ensure compatibility.

M. Luminaire Color Rendering Index (CRI) shall be a minimum of 80 for interior luminaires, and a minimum of 70 for exterior luminaires.

N. LED luminaire shall be thermally designed as to not exceed the maximum junction temperature of the LED for the ambient temperature of the location the luminaire is to be installed. Rated case temperature shall be suitable for operation in the ambient temperatures typically found for the intended installation. Exterior luminaires to operate in ambient temperatures of -20°F to 122°F (-29°C to 50°C).

O. LED driver shall have a minimum power factor (pf) of 0.9 and a maximum crest factor (cf) of 1.5 at full input power and across specified voltage range.

P. Luminaire shall operate normally for input voltage fluctuations of plus or minus 10 percent.

Q. Luminaire shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.

R. Wiring connections to LED drivers shall utilize polarized quick-disconnects for field maintenance.

S. All connections to luminaires shall be reverse polarity protected and provide high voltage protection in the event connections are reversed or shorted during the installation process.

T. Fuse Protections: All luminaires shall have built-in fuse protection. All power supply outputs shall be either fuse protected or be Polymeric Positive Temperature Coefficient (PTC)-protected as per Class 2 UL listing.

U. The LED luminaire shall carry a limited 5-year warranty minimum for LED light engine(s)/board array, and driver(s).

V. Provide all of the following data on submittals:
   1. Delivered lumens
   2. Input watts
   3. Efficacy
   4. Color rendering index.

W. The failure of one LED shall not affect the operation of the remaining LEDs.

2.3 FIXTURE SUPPORT COMPONENTS

A. Comply with Division 26 Section "Basic Electrical Materials and Methods" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated, 12 gage2.68 mm.

C. Wires For Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage (2.68 mm).

D. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fixtures: Set level, plumb, and square with ceilings and walls.

B. Suspended Fixture Support: As follows:

   1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
   2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
   3. Continuous Rows (stem mounted): Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
   4. Continuous Rows (cable mounted): Suspend from cable.
   5. Support: Per NEC 410-16.

C. Adjust aimable fixtures to provide required light intensities. Adjust all fixtures to the satisfaction of the Engineer. Adjustments required at night shall be done at no additional charge. Provide all equipment needed including scaffolding, if required.

END OF SECTION 26 50 00

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SECTION 31 10 00

DOT 201

SITE CLEARING

201.01 DESCRIPTION. This work consists of the performance of actions that are required to clear and prepare the site for subsequent construction operations. These actions all have a common characteristic; they involve the removal and legal disposal of both designated vegetative materials and man-made objects and facilities. These actions include, but are not limited to, the following: clearing and grubbing; cutting and removing isolated trees and stumps; partial or complete removal of isolated tree stumps; trimming tree roots; removal and disposal of culverts, masonry; drainage and utility structures; pipe; rigid and flexible pavement; granite, concrete and bituminous curbing; fences and railings; guardrail of all types; underground and above-ground storage tanks; miscellaneous items such as highway bounds and signs; demolition of buildings and structures; and all other obstructions or undesirable materials within the right-of-way. All such materials, objects and facilities shall be removed and legally disposed of.

The Contractor shall be compensated for clearing and preparing the site for construction operations through individual Proposal items; one such item for each removal and disposal action.

The following Subsections contain descriptions of some of the most common removal and disposal actions.

201.01.1 Clearing and Grubbing. This work consists of cutting, removing from the ground, and disposing trees, stumps, brush, shrubs, hedges, roots and other vegetation which occur within the right-of-way and interfere with excavation, embankment, fencing, clear vision, or are otherwise considered objectionable. This work also includes the preservation from injury or defacement of all vegetation and objects outside clearing limits.

201.01.2 Cutting and Removing Isolated Trees and Stumps. This work consists of cutting and removing designated isolated trees and stumps in excess of 4 inches in diameter (measured at 4 inches above existing ground) which are located within the general area of construction work but which are not located within the areas specified for Clearing and Grubbing.

201.01.3 Pavement, Sidewalks, and Curbing. This work consists of removing flexible and rigid pavement including surface, base and/or subbase courses; granite, concrete and bituminous curbing; and concrete and bituminous sidewalks as shown on the Plans.

201.01.4 Miscellaneous Objects. This work consists of removing miscellaneous objects such as mail boxes and posts, road signs, private signs, highway bounds and any other objects not covered by any preceding Subsection, specifically indicated on the Plans to be removed or required to be removed for the construction of the new work.

201.01.5 Load and Haul Solid Waste and Disposal of Solid Waste. This work consists of collecting, loading, hauling and disposing of on-site solid waste material, including but not limited to trash,

litter, household appliances, tires, vegetative and other on-site debris.

Unless otherwise provided for in the contract documents, this item of work shall not include the removal and disposal of solid waste material or debris generated by the Contractor's construction operations, including soil and rock excavation, the removal of pavement, sidewalks and other highway infrastructure, clearing and grubbing operations and/or the removal and disposal of contaminated soils.

201.02 MATERIALS. For the requirements relating to Common Borrow and Gravel Borrow, see **Subsections 202.02.1 and 202.02.2**, respectively, of these Specifications.

201.02.1 Load and Haul Solid Waste and Disposal of Solid Waste: Regulatory Provisions. The Contractor shall ensure that the removal of all debris is conducted in a manner consistent with the requirements of the Rhode Island Building Code and OSHA standard 29 CFR 1926: Safety and Health Regulations for Construction.

Solid waste materials shall be disposed of in accordance with EPA regulations (40 CFR 239 –259, including latest revisions) and RIDEM solid waste regulations (DEM OWM-SW-04-01, including latest revisions), and any and all other applicable regulations.

The Contractor shall obtain all required permits for hauling and disposal of waste materials, and shall be responsible for payment of tipping and other required fees.

201.03 CONSTRUCTION METHODS. The Contract Documents will provide all necessary information relating to right-of-way and constructions lines, and will designate all trees, shrubs, plants and other objects and facilities to remain within the project limits. The Contractor shall preserve everything designated to remain.

201.03.1 Clearing and Grubbing. All trees, stumps, brush, shrubs, hedges and roots, not desig- nated to remain, but within the fill lines of embankments and less than 3 feet in height to subgrade, shall be cleared and grubbed. When authorized, or when the height of embankment to subgrade exceeds 3 feet, the Contractor may leave stumps provided they do not extend more than 6 inches above the original ground or low water level.

After clearing, and by the end of each day's grubbing operation, the Contractor shall install erosion control measures that are indicated on the Plans or as directed by the Engineer. Such erosion control measures shall be installed in strict accordance with the requirements of **SECTIONS 206, 207,** and **208** of these Specifications, **PERIMETER EROSION CONTROLS, CHECK DAMS**, and **TEMPORARY DEWATERING BASINS**, respectively.

The Engineer may permit sound stumps to be cut off not more than 6 inches above the ground and to be left outside of the construction limits of cut and embankment areas, except in the area to be rounded at the top of back slopes where stumps are to be cut off flush with or below the surface of the final slope line.

Except in areas to be excavated, stump holes and other holes from which obstructions are removed, shall be backfilled with material acceptable to the Engineer and compacted in accordance with **Subsection 202.03.3; Compaction - General**, of these Specifications.

a. Disposal of Perishable Materials. No burning of trees, brush, shrubs, or perishable material

will be allowed on any construction project site. The Contractor will not be allowed to haul trees, brush, shrubs or perishable material from the project for the purpose of burning. The Contractor must dispose of the trees, brush, shrubs, or other perishable material by any of the following methods:

1. The Contractor may sell or salvage all merchantable timber in the Clearing and Grubbing area which has not been removed from the right-of-way prior to the beginning of construction.

2. The Contractor may chip trees on the site. All wood chips will become the property of the Contractor and must be removed promptly from the site. When the project plans call for the use of wood chips, the Contractor may stockpile the required quantity on the site at a location approved by the Engineer.

3. Unless otherwise specified in the Contract Documents all trees, brush, shrubs, and other perishable material shall be legally disposed of at locations off the project site. Such disposal shall require the written permission of the property owner on whose property the materials are to be buried and, if necessary, the Rhode Island Department of Environmental Management. The Contractor shall make all necessary arrangements with the property owners and obtain necessary permits for obtaining suitable disposal locations and the Contractor shall supply the Engineer with a copy of the written permission for such disposal from the property owner before any disposal may take place.

b. Low Hanging Branches. Low hanging branches and unsound or unsightly branches on trees and shrubs designated to remain shall be removed as directed. Branches of trees extending over the road surface shall be trimmed to give a clear height of 20 feet above the road surface. All trimming shall be done by skilled workmen in accordance with sound tree surgery practices and under the supervision of a licensed arborist. Cut or scarred surfaces of trees or shrubs shall be treated with an approved waterproof antiseptic tree paint.

c. Diseased Vegetation. All elm trees, trimmings, or branches of same or other wood designated by the Rhode Island Department of Environmental Management as a host of a serious plant disease or disease carrier, as indicated on the Plans, shall be buried at a sanitary landfill location within forty-eight hours after cutting.

Mechanical chipping of small branches and brush may also be employed where disposal area space limitations require such measures. The resulting chips need not be buried.

201.03.2 Cutting and Removing Isolated Trees and Stumps. The isolated trees and stumps to be removed will be designated on the Plans. Those so-designated shall be removed and disposed of by the Contractor in accordance with the provisions of **Subsection 201.03.1** of this Section.

201.03.3 Partial Removal of Isolated Tree Stumps. The isolated tree stump to be partially removed will be designated by the Engineer. Those so-designated shall be removed to 6 inches below final grade by the Contractor. The resulting hole shall then be filled in with like materials as required.

201.03.4 Frames, Covers or Grates shall be removed and either legally disposed of or stacked and stockpiled for subsequent re-use.

201.03.5 Culverts, Drainage and Utility Structures.

a. Culverts and Drainage Structures. Unless otherwise directed, the substructures of existing

structures shall be removed down to the natural stream bottom and those parts outside of the stream shall be removed down one foot below natural ground surface. Where such portions of existing structures lie wholly or in part within the limits of a new structure, they shall be removed as necessary to accommodate the construction of the proposed structure.

b. Utility Structures. Sewer and utility structures which are designated to be removed or which interfere with the new construction shall be removed. When existing sewers or utilities are to be extended or otherwise incorporated into the new work, only such part of the existing lines shall be removed as to provide a proper connection with the new work.

c. Backfilling. No portions of the existing structures shall be used to backfill the excavations required for the removal of such structures. Excavations shall be backfilled with gravel borrow placed in 6-inch layers and compacted to 95 percent of maximum density in accordance with AASHTO T180.

201.03.6 Pipe. All pipe designated to be removed shall be so-removed and legally disposed of. The Contractor is allowed to dispose of concrete pipe in an embankment within the project limits, provided that the pipe is broken up into sufficiently small pieces to preclude the formation of voids.

201.03.7 Pavement, Sidewalks, and Curbing. All pavement, base course, sidewalks, curbs, gutters, of whatever nature designated to be removed shall be so-removed and legally disposed of.

When specified, ballast, gravel, bituminous material or other surfacing or pavement materials shall be removed and stockpiled as required. Otherwise such material shall be legally disposed of.

Where the remainder of the existing pavement or sidewalks are to remain undisturbed, a clean saw cut shall be made to separate the remaining pavement from that being removed.

201.03.8 Removal of Miscellaneous Objects. All miscellaneous objects designated to be removed shall be so-removed and legally disposed of.

constitutes full and complete compensation for all labor, materials, and equipment and for all incidentals required to finish the work, complete and accepted by the Engineer.

201.03.9 Removal of Pavement, Sidewalks, and Curbing. The accepted quantities of "Removal of Pavement and Sidewalks" will be paid for at their respective contract unit prices per square yard as listed in the Proposal. The accepted quantities of "Removal of Curbing" will be paid for at the contract unit price per linear foot as listed in the Proposal. The prices so-stated constitute full and complete compensation for all labor, materials, and equipment and for all incidentals required to finish the work, complete and accepted by the Engineer.

Saw cutting associated with removal of pavement, sidewalks or curbing will be paid for separately under the appropriate work item(s) as listed in the Proposal.

201.03.10 Removal of Miscellaneous Objects. The accepted quantities of "Removal of Miscellaneous Objects" will be paid for at their respective contract unit prices per each as listed in the Proposal. The prices so-stated constitute full and complete compensation for all labor, materials, and equipment and for all incidentals required to finish the work, complete and accepted by the Engineer.

201.03.11 Load and Haul Solid Waste and Disposal of Solid Waste. “Load and Haul Solid Waste”

and "Disposal of Solid Waste" will be paid for by their respective contract unit bid prices per ton as listed in the Proposal. The prices so-stated constitute full and complete compensation for all disposal fees, recycling of waste materials, labor, materials, equipment and all incidentals required to finish the work, complete and accepted by the Engineer.

END OF SECTION

SECTION 31 23 00

DOT 202

EXCAVATION AND EMBANKMENT

202.01 DESCRIPTION. This work consists of excavation, and the satisfactory placement and compaction, or disposal, of all materials encountered within the limits of the work and which are necessary for the construction of the roadway. Excavation and embankment shall be in reasonably close conformity with the dimensions and sections indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

Excavation will be classified as "earth excavation," "rock excavation," "rock excavation - mechanical," "muck excavation," "channel excavation-earth," "channel excavation-rock," "channel excavation rock-mechanical," "loam excavation," and "unclassified excavation," all as hereafter described.

202.01.1 Earth Excavation. Earth excavation shall include the removal of suitable and unsuitable soils not otherwise classified herein, and the removal of boulders and rock fragments less than 1 cubic yard in volume, from the following areas:

a. Within the design excavation section.

b. Beyond the design excavation section of the roadbed or side slopes where unsuitable materials are encountered.

c. Beyond the design excavation section of shallow embankments when unsuitable materials are encountered.

202.01.2 Presplitting Bedrock. This work shall consist of producing a plane of split rock prior to any drilling or blasting for roadway rock excavation. This plane will be formed to follow the design of rock slope lines and shall be extended from the top of the bedrock surface to the proposed rock shelf levels and to the toe of finished rock slope, to the invert of side drains, or to the depths specified on the Plans.

202.01.3 Rock Excavation. Rock excavation shall consist of the removal of intact bedrock, and boulders or detached bedrock fragments which have a volume of 1 cubic yard, or more. Boulders and detached rock fragments which have a volume of less than 1 cubic yard are considered "Earth Excavation."

202.01.4 Rock Excavation - Mechanical. This classification of rock excavation shall be employed in areas where blasting is prohibited. Rock excavated under this classification shall be removed by employing hydraulic splitters, air rams, paving breakers, or any other mechanical method approved by the Engineer.

202.01.5 Unsuitable Soils. Unsuitable soils shall include and are hereby defined as those soils, other than muck, which due to their consolidation properties, degree of saturation, gradation, or other deleterious characteristics will not provide a stable subgrade or side slopes; cannot be used as, or support embankment, or cannot be placed and compacted as backfill, or do not otherwise conform to the requirements of these Specifications.

202.01.6 Muck Excavation. Muck excavation shall consist of the removal and disposal of deposits of saturated or unsaturated mixtures of soils and organic matter not suitable for foundation material regardless of moisture content. The excavated muck shall be stockpiled at approved locations within the right-of-way and/or legally disposed of.

202.01.7 Channel Excavation Earth. Channel excavation earth shall include all materials other than water or "Channel Excavation Rock," removed from existing, new, or temporary water courses as indicated on the Plans or as directed by the Engineer.

202.01.8 Channel Excavation Rock. Channel excavation rock shall include intact bedrock and boulders 1 cubic yard or more in volume removed from existing, new, or temporary water courses, as indicated on the Plans or as directed by the Engineer.

202.01.9 Channel Excavation Rock - Mechanical. This classification of rock excavation shall be employed in channel construction areas where blasting is prohibited. Rock excavation under this classification shall be removed by employing hydraulic splitters, air rams, paving breakers, or any other mechanical method approved by the Engineer.

202.01.10 Loam Excavation. Loam excavation shall include loam or topsoil removed between the limits indicated and the depths specified on the Plans or directed by the Engineer. The excavated loam shall be stockpiled at approved locations within the right-of-way.

202.01.11 Unclassified Excavation. Unclassified excavation shall consist of the excavation, stockpiling and/or removal and legal disposal of a composite mixture of various types of materials which the Engineer has determined to be impractical to segregate into separate classifications.

202.01.12 Embankment Construction. Embankment construction shall consist of constructing roadway embankments, including preparation of the areas upon which they are to be placed; the benching of embankments; the construction of side slopes and toe drainage ditches; the construction of dikes within or outside the right-of-way; the placing and compacting of approved material within roadway areas where unsuitable material has been removed; and the placing and compacting of embankment material in holes, pits and other depressions within the roadway area. Only approved materials shall be used in the construction of embankments and backfills.

202.02 MATERIALS

202.02.1 Common Borrow. Common Borrow shall consist of approved material required for the construction of embankments or for other portions of the work. Common Borrow shall meet the requirements of **Subsection M.01.01** of these Specifications prior to its final placement on the Project. The practice of culling deleterious or out of specification material after placement and/or grading in-place will not be allowed.

202.02.2 Gravel Borrow. Gravel Borrow shall meet the requirements of **Subsection M.01.09; Gradation of Aggregates, Table I, Column I** prior to its final placement on the Project. The practice of culling deleterious or out of specification material after placement and/or grading in- place will not be allowed**.**

202.03 CONSTRUCTION METHODS.

202.03.1 Excavation-General. The Contractor shall remove all soil, rock, and other material and utilize or dispose of these materials as required by the Plans and these Specifications. The excavation for the roadway, intersections and entrances shall be finished to reasonably smooth and uniform surfaces. All rock cuts shall be thoroughly cleaned and scaled of all loose fragments. No materials shall be wasted without permission of the Engineer. Excavation operations shall be conducted so that material outside of the limits of slopes will not be disturbed. Prior to beginning excavation operations in any area, all necessary work in that area shall have been performed in accordance with **SECTION 201; SITE PREPARATION**, and all erosion and pollution controls shall have been installed in accordance with the applicable requirements of **SECTIONS 206 through 211** of these Specifications.

The Contractor shall maintain slopes, crowns, berms, and ditches on all excavations to insure satisfactory drainage at all times to protect the work, and maintain safe working conditions.

When the Contractor's excavating operations encounter remains or artifacts of potential historical or archaeological significance, the operations shall be temporarily discontinued. The Contractor will immediately contact the Engineer who will determine the disposition thereof. When directed by the Engineer, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and shall remove them for delivery to the custody of the proper State authorities. Such excavation will be considered and paid for as Extra Work in accordance with **Subsection 104.05** of these Specifications.

a. Rock Excavation-General. Should bedrock be encountered above the design finish grade, the Contractor shall immediately notify the Engineer of the change in classification. The Contractor shall then continue soil excavation to expose the bedrock surface and to allow the Engineer to perform the necessary elevation survey and take cross-sectional measurements.

Prior to removal of overburden, or presplitting and blasting to excavate to the design rock slope face, the Contractor shall locate the presplit line, and the intersection of the crest of the design slope with existing ground surface. Elevations of existing ground surface along this intersection alignment shall be established at one-half station intervals or as directed by the Engineer. The Contractor shall install marker stakes at the directed station intervals, offset as directed by the Engineer.

Rock Excavation may be performed by blasting, where not prohibited, or by mechanical methods. However, where blasting is allowed, whatever the method used, bedrock removal shall be classified, measured and paid for as Rock Excavation.

The Contractor shall be required to submit a Blasting Plan prior to the performance of any drilling or blasting. The Plan shall include as a minimum: full details of drilling and blasting patterns and techniques proposed for controlled and production blasting. The blasting plan is for quality control and record keeping purposes. Review of the blasting plan does not relieve the Contractor of the responsibility to use existing drilling and blasting technology and for obtaining the desired results.

The Contractor shall be required to employ a qualified blasting supervisor, with presplitting experience acceptable to the Engineer. This supervisor shall be available, as required, throughout the duration of presplitting and fragmentation blasting rock excavation.

Unless otherwise specified, material classified as rock shall be excavated to a minimum depth of 12 inches below subgrade within the limits of the roadbed, and the excavation backfilled with material as designated on the Plans or approved by the Engineer.

Rock removal in excess of 12 inches below subgrade will not be paid for, but will be measured by the Engineer to determine excess backfill volume, said volume to be deducted from that backfill measured for payment. All backfilling in excess of the 12-inch depth shall be performed at the expense of the Contractor.

1. **Rock Excavation-Presplitting.** When required, the Contractor shall presplit the rock along the designated cut face to produce a uniform plane of rupture, so that the resulting face will not be affected by subsequent fragmentation blasting and excavation operations, all in accordance with the limits designated or indicated on the Plans.

Presplitting shall be used whenever the intended exposed rock slope exceeds 10 feet in vertical height. Rock cuts more than 25 feet in vertical height may be presplit in stages (lifts) at the option of the Contractor, provided, however, that no stage shall be less than 10 feet in depth, and further provided that no payment will be made for additional excavation quantities caused by the offsetting of presplitting holes beyond the specified face in the top or successive stages. Presplitting holes in successive stages shall be offset not more than 2 feet inside of the previously presplit stage face.

When drilling and blasting behind existing previously drilled and blasted rock faces to widen the rock cut, the Contractor shall presplit along the new design rock face alignment and exercise all due care to prevent overblasting of the new rock face. If after excavating the blasted rock, it is not possible to hold a true and neat face-of-rock, then the Contractor will excavate all loose and unstable, fractured or seamed rock to an agreed stable face of rock behind the neat lines as ordered by the Engineer.

The drilled presplitting holes shall follow the required rock slope lines and inclinations. Unless otherwise permitted by the Engineer, presplitting holes shall have a maximum spacing of 3 feet, center-to-center, and a diameter not greater than 3 inches.

Presplitting holes shall be extended from the top of solid bedrock surface to 2 feet below the design toe of finished bedrock slope, unless different depths are specified on the Plans. The proper angle of drilling shall be maintained at all times so that all presplit holes lie essentially in the same plane and are parallel to each other. No hole shall deviate more than one half-foot at any place in the plane of the specified slope line, nor in its vertical alignment.

2. **Rock Excavation-Fragmentation Blasting**. The Contractor shall adjust his blasting operations according to the characteristics and structure of the rock formation to obtain the required slope without fracturing rock beyond the presplit face.

(a) Fragmentation blast holes shall be positioned so that:

- No portion of any blast hole 3 inches or less in diameter shall be within 4 feet of the designated presplit face.

- No portion of any blast hole greater than 3 inches in diameter shall be within 12 feet of the designated presplit face.

(b) The Contractor shall inspect and test each hole for its entire depth to determine the possible presence of any obstruction prior to placing the charge. No loading shall be permitted until the hole is clear of all obstructions for its entire depth. All necessary precautions shall be used in placing the charge to prevent cave-in of material along the sidewall of the hole.

All space in each hole not occupied by the explosive charge shall be filled with 3/8-inch size clean stone chips. No other material or type of stemming will be permitted.

(c) Blasting for presplitting shall precede fragmentation blasting.

(d) Remove the blast rock and expose the presplit face such that the surfaces of slopes in rock cuts are free from all loose stone or shattered edges.

All unsuitable material, breakage, and slides, even though located beyond the payment lines, shall be removed as directed.

b. Excavation of Unsuitable Materials. Where unsuitable soils are encountered within the excavated section and above the design finish grade, excavation shall be suspended to allow area measurements and survey of elevations across the exposed surface. Excavation of unsuitable soils shall then proceed until either a change of excavation classification occurs, or until the excavation reaches a stable base or as otherwise directed by the Engineer. If a change in classification occurs, a second set of surveyed elevations shall be obtained. The Engineer shall determine the required transverse spacing and station intervals of survey points.

Where excavation to the designed subgrade elevation results in a subgrade or slopes of unsuitable soil, the Engineer shall require the Contractor to remove the unsuitable materials and backfill and compact to the designed subgrade elevation with approved material. The Contractor shall conduct his operations in such a way that the Engineer can take the necessary cross-sectional measurements before the backfill is placed.

Material designated as unsuitable shall be legally disposed of at no additional cost to the State.

Prior to placing of any subbase, base or pavement courses, all surplus excavated material including stumps, earth, rock, etc., shall be removed and the shoulders, ditches and slopes graded to approximate final lines.

c. Muck Excavation. If the unsuitable material involved is muck, the excavation will be accomplished without entrapping muck within the backfill. The backfilling of the excavation area shall proceed immediately behind the muck excavation so material that is displaced by the backfill can be removed. The excavation will be backfilled to the ground level or 3 feet above water level, whichever is higher, with rock or other suitable granular material selected from the roadway excavation. If suitable material is not available from the excavation, it will be obtained from other approved sources.

d. Haulage. Compensation for haulage of earthwork materials within the project limits shall not be paid for separately, but shall be deemed to be included in the contract unit prices for the respective items.

202.03.2 Embankment Construction-General. Embankment construction for roadways and associated ramps, dikes, and berms shall consist of the placement and compaction of suitable earth and rock excavation materials, or borrow material, as required. Construction of embankment may continue during cold weather, however, frozen soils shall be removed and shall not be permitted as fill for embankment. Rocks, broken concrete, or other solid materials shall not be placed in embankment areas where piling, guardrail, electrical poles, conduits, etc., are to be driven or placed.

a. Preparation of Foundation. After cleaning and removal of topsoil where necessary, the Contractor shall notify the Engineer and prepare the embankment foundation as follows:

1. Where embankment will be greater than 4 feet in height above existing ground, the Engineer shall determine whether preparation of the foundation will be necessary.

2. For embankment less than 4 feet in height above existing ground, completely break up the cleared ground surface to a minimum depth of 6 inches by plowing or scarifying. Compact the existing ground surface in accordance with **Subsection 202.03.3.**

3. Where unsuitable soils occur at existing ground surface, excavate and replace unsuitable soils with excavation or approved borrow material and compact in accordance with the applicable provisions of **Subsection 202.03.3.**

4. Where embankment is less than 2 feet in height above an existing road surface, scarify or pulverize the existing roadway to a depth of 6 inches below the pavement surface. Reduce all particles to a maximum size of 6 inches and produce a uniform material. Compact the roadway surface in accordance with the applicable provisions of **Subsection 202.03.3.**

b. Roadway Embankment-Earth. Roadway embankments may consist of earth excavation, borrow material, or a combination thereof. Unless the Department mandates the sequencing of materials in the embankment, borrow material shall not be placed until all suitable and accessible materials from all structure, trench, and roadway excavations have been placed. If the Contractor places more borrow than is required and thereby causes a waste of excavation, the amount of such waste will be deducted from the borrow volume as measured.

When borrow material is required to construct embankment, the Contractor shall make his own arrangements to procure the borrow material or open a borrow source. The Contractor shall also determine the suitability of the borrow material for use in embankment by appropriate laboratory testing.

All roadway earth embankment sections shall be constructed in horizontal lifts not exceeding 15 inches (before compaction) and shall be compacted as specified in **Subsection 202.03.3 Compaction-General** before the next lift is placed.

Each lift shall be placed to the full width of the embankment section unless otherwise directed. If the full width of the embankment section cannot be placed at one time, the lifts shall be stepped back at least the length of the lift thickness to allow for benching of the remaining fill.

The entire area of each lift shall be uniformly compacted to at least the required minimum density by use of compaction equipment consisting of rollers, compactors or a combination thereof. Earth-moving and other equipment not specifically manufactured for compaction purposes shall not be considered as compaction equipment.

The moisture content of all roadway embankment materials at the time of compaction shall be that suitable for the soil to meet the required density as specified in **Subsection 202.03.3 Compaction – General,** but in no case shall it exceed 2.5% above the Optimum Moisture Content as determined by AASHTO T180. The following applies even if the moisture content is below the allowable upper limit: As observed by the Engineer, should the compacted lift exhibit instability as evident by pumping or rutting under equipment, insufficient moisture as evident by dusting, or excessive moisture or saturation, the Contractor shall make corrections to the lift at no additional cost to the State.

As the compaction of each lift progresses, continuous leveling and manipulating will be required to attain uniform density. Water shall be added or removed, if necessary, in order to obtain stability and the required density. Construction equipment shall be routed uniformly over the entire surface of each lift.

If the natural-in-place moisture of the excavated material makes it impractical to compact the soil, the Contractor shall dry the soil by disking, harrowing, blading or other approved means. If these methods do not produce the specified compaction, the Contractor shall strip and replace the soil.

The embankment shall be crowned to shed runoff and constructed such that side slopes are protected from erosion.

202.03.3 Compaction-General. Each lift shall be uniformly compacted to the specified density before the next lift is placed. The specified density shall be obtained by utilizing any approvedcompaction equipment such as: pneumatic tired compaction equipment, or three-wheeled power rollers, or vibratory, sheepsfoot, or tamping rollers, or other approved types of compaction equipment.

Dumping and rolling areas shall be kept separate, and no lift shall be covered by another until the compaction requirements of this Subsection have been met. Hauling and leveling equipment shall be routed and distributed over each lift of the fill so as to make best use of that compaction effort.

a. Densities.

1. Maximum dry density and optimum moisture content will be determined by AASHTO T180.

2. Field density of soil in place shall be determined by either AASHTO T191 or a nuclear moisture density gauge conforming to AASHTO T310.

3. The method of correcting for oversize particles in soil compaction test results shall conform to AASHTO T224.

4. The Method Specification for Compaction of Soils as described in Para. d. shall apply if an approved soil does not meet the parameters set by AASHTO T180.

b. Compaction of Earth Embankment.

1. Subgrade. Where the resulting subgrade surface is the bottom of an excavation (i.e. undisturbed existing ground), the subgrade surface shall be compacted as required, to not less than 95 percent of maximum dry density. When a nuclear density gauge is used, the in place dry density will be measured by the direct transmission method per AASHTO T 310 to a depth of 12 inches below the exposed surface.

As observed by and at the discretion of the Engineer, determinations may be made of instability and excessive or insufficient moisture of the subgrade material and in such cases, the Contractor shall correct the lift at no additional cost to the State.

END OF SECTION

SECTION 31 23 16.16

DOT 202

STRUCTURE EXCAVATION AND BACKFILL

203.01 DESCRIPTION. This work consists of the removal and disposal of all material of whatever nature necessary for the construction of all structures and incidental foundations not included elsewhere in these Specifications. The work includes preserving channels, shoring and bracing, constructing cofferdams, sealing foundations, dewatering, excavating, preparing foundations, backfilling, and subsequent removal of safety features and cofferdams. Finally, this work shall include all necessary on-site or borrow backfill, as hereinafter specified.

The material to be excavated is that which is included within the pay lines indicated on the Plans and as hereinafter defined, and which is not otherwise classified in either **SECTION 202; EARTHWORK AND EMBANKMENT** or **SECTION 205; TRENCH EXCAVATION**.

Structure Excavation and Backfill will be subdivided into the following six classifications:

203.01.1. Structure Excavation; Earth. Structure excavation; earth shall include all excavation not classified as rock, rock-mechanical, masonry, or unclassified excavation.

203.01.2 Structure Excavation; Rock. Structure excavation; rock shall include the removal of bedrock or boulders and detached bedrock fragments over 1 cubic yard in volume when encountered within the limits of Structure Excavation. Boulder and rock fragments less than 1 cubic yard volume are considered Structure Excavation; Earth.

203.01.3 Structure Excavation; Rock - Mechanical. This classification of structure excavation - rock shall be employed in areas where blasting is prohibited. Rock excavated under this classification shall be removed by employing hydraulic splitters, air rams, paving breakers, or any other mechanical methods approved by the Engineer.

203.01.4 Unclassified Structure Excavation. Unclassified structure excavation shall include the removal and disposal of that composite mixture of various types of materials for which the Engineer determines it is impractical to classify into separate classifications for payment, and which is encountered within the designated pay lines.

203.01.5 Crushed Stone Fill Under Structures. This work shall consist of providing one or more courses of crushed stone fill and filter fabric under structures' footings on prepared subgrade surfaces in reasonably close conformity with the lines, grades, thickness and typical cross sections indicated on the Plans.

203.02 MATERIALS. Backfill materials as specified in the Contract Documents shall conform to the applicable requirements of **SECTION M.01; BORROW AND AGGREGATES**, of these Specifications. All backfill materials shall conform to all applicable specification requirements prior to its final placement on the project. The practice of culling deleterious or out of specification material after placement and/or grading in-place will not be allowed.

203.02.1 Crushed Stone Fill Under Structures. Crushed stone shall conform to the gradation requirements of **Subsection M.01.09, Table I, Column II** of these Specifications. Filter fabric shall be one of those materials included on the Department's Approved Materials List.

203.03 CONSTRUCTION METHODS.

203.03.1 Excavation.

a. Notification. The Contractor shall notify the Engineer sufficiently in advance of the beginning of excavation, and immediately when it believes there is a change in classification of structure excavation, in order that cross-sectional elevations and measurements may be taken of the undisturbed ground.

b. Dimensions of Excavation. The excavation for footings shall be of sufficient size to accommodate both the placement of the structure as indicated on the Plans and the placement and compaction of backfill. Excavation shall extend at least 2 feet horizontally beyond the vertical face of footings, and a minimum of 12 inches below the base of footings.

c. Change in Elevation or Dimension of Excavation. The elevation of the bottoms of excavations shall be as indicated on the Plans. However, the Engineer may direct the Contractor to make such changes in the elevation or dimensions of the excavation as may be necessary to secure a satisfactory foundation.

Whenever such additional work as described above effects changes in quantities involving items designated in the Contract, the provisions relating to such items as specified under **SECTION 104; SCOPE OF WORK**, will apply.

d. Approval of Foundation. No formwork or permanent work shall commence until after the Engineer has approved the depth and dimensions of the excavation, the character of the material and the condition of the foundation. Sounding rods shall be driven at such points and to such depths as may be directed by the Engineer.

The Contractor shall provide assistance to the Engineer as may be necessary to make an adequate inspection of the foundation material. No extra compensation will be allowed for providing this assistance.

All unsheathed excavation shall have sufficient side slopes to prevent earth sliding in on the work.

e. Utilization of Excavated Materials. All suitable excavated material shall be utilized as backfill or in embankments. Surplus excavation or unsuitable materials may be either disposed of in non-critical areas within the project limits or legally disposed of.

f. Blasting. All blasting in connection with rock excavation within project limits shall be completed before the placing of any structure concrete unless an exception is granted by the Engineer in writing.

g. Alternatives & Unsatisfactory Bearing Surfaces. Whenever in the opinion of the Engineer the natural foundation material is inadequate to safely support the structure, the Contractor shall proceed with alternative methods as directed by the Engineer. Where not otherwise listed in the Proposal, such operations shall be considered "Extra Work," and paid for in accordance with **Subsection 104.05** of these Specifications.

h. Water. When water is encountered, provisions shall be made for draining or dewatering within the excavation. The dewatering work shall be accomplished by means that will prevent disturbing the bottoms of excavations or adjacent structures. When foundation material is relatively impermeable, such that water accumulations tend to soften the cementing material or puddle the surface, provisions shall be made to drain the excavation by suitable channels outside of, and slightly below, the footing level. These channels shall conduct the water to outfalls or sump pumps. Foundation material unduly disturbed or softened by the use of equipment or by inadequate handling of water shall be removed and replaced with material satisfactory to the Engineer and at the Contractor's expense.

i. Preparation of Bearing Surface. All rock or other hard foundation material shall be freed from all loose material, cleaned and cut to a firm surface, either level, stepped or serrated as directed by the Engineer. All seams shall be properly cleaned out and filled with concrete mortar or grout. All shaping of ledge rock shall be carefully executed to avoid any unnecessary excavation of sound rock. No payment for overbreak will be allowed.

203.03.2 Dewatering. Dewatering from the interior of any foundation enclosure shall be carried out in such manner as to preclude the possibility of movement of water through any fresh concrete. No pumping will be permitted during the placing of concrete or for a period of at least 24 hours thereafter, unless it be done from a suitable sump separated from the concrete work by a mortar-tight form, bulkhead, or other effective means.

203.03.3 Embankments Under Structure Foundations. Embankments under stub abutments, walls, culverts, footings, and other foundations where stability requirements are essential shall be constructed of gravel borrow conforming to **Subsection M.01.09, Table I, Column I,** except that the material shall not contain particles greater than 6 inches maximum dimension.

Embankments shall be constructed such that side slopes are sufficiently stable, and such that the widths of embankments shall extend horizontally 2 feet beyond the vertical faces of footings. The gravel borrow shall be placed in layers not exceeding 12 inches in depth before compaction and shall be compacted to 95 percent of maximum density as determined by AASHTO T180.

Embankments under pile supported foundations shall be compacted to 90 percent of maximum density as determined by AASHTO T180.

203.03.4 Backfilling.

a. Protection of Structures During Backfilling. No fill material shall be placed against any structure until permission to place fill has been granted by the Engineer and in no case until the masonry has obtained the 28-day compressive strength or unless otherwise specified in the Special Provisions.

In all cases proper precautions shall be taken to assure that the method of backfilling does not cause movement of or undue strain on any part of the structure. Fill material shall be deposited and compacted behind abutments, walls and miscellaneous structures as hereinbefore specified. Special precautions shall

be taken when placing fill around slender foundations, rigid frame legs, piers or over and around arches and box culverts, to deposit the material on both sides of such structures to approximately the same elevation at the same time.

Backfill materials shall be carefully placed to avoid damage to masonry and waterproofing treatments. If backfilling or other operations do in fact damage masonry or waterproofing, the Contractor shall remove the backfill and replace or repair the damaged work or waterproofing at the direction of the Engineer. All such repairs, replacement of materials, and labor shall be provided at no additional cost to the State.

b. Pervious Fill Adjacent to Structures. The material placed adjacent to, or in contact with arches, culverts, retaining walls, wingwalls, secondary structures, and other areas indicated on the Plans shall be pervious fill.

Pervious fill shall be placed in layers not over 12 inches in depth before compaction and shall be compacted to 95 percent of maximum density as determined by AASHTO T180. In those locations not accessible for normal placing and rolling and for minor operations, pervious fill shall be placed in lifts not to exceed 8 inches and compacted by means of mechanical tampers, or suitable vibratory equipment. For minor operations, hand tamping with heavy iron tampers may be used.

c. Common Backfill. All spaces excavated and not occupied by permanent works, pervious fill, or gravel borrow, shall be backfilled with suitable material, such material to be compacted in 1-foot lifts up to the surface of the surrounding ground.

Suitable material shall be free of vegetative matter, organic or compressible soils, and shall meet the requirements for Common Borrow except that the material shall not contain particles larger than 6 inches. The Engineer may approve excavated soil for re-use as suitable material.

The surface shall then be neatly graded. Backfill shall be compacted to 95 percent of maximum density as determined by AASHTO T180. No separate payment will be made for this work.

203.03.5 Crushed Stone Fill Under Structures. The crushed stone shall be placed and compacted on a prepared surface to the required thickness indicated on the Plans. A filter fabric must be placed between the crushed stone and surrounding soils. The surface of the crushed stone must be placed in such a manner that a reasonably uniform texture is provided. The surface will have a tolerance of ½-inch, plus or minus, to the grade indicated on the Plans and/or as directed by the Engineer.

SECTION 31 23 33

DOT 205

TRENCHING AND BACKFILLING

205.01 DESCRIPTION. This work consists of the excavation, dewatering, and backfill, or disposal, of all materials required for the construction of box culverts, pipe culverts, storm drains, drainage structures, utilities, utility structures and ditches in reasonably close conformity with the dimension and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

Trench excavation also includes the provision of temporary or permanent trench protection as indicated on the Plans and as specified herein.

205.01.1 Trench Excavation; Rock. Trench excavation; rock shall consist of the removal of bedrock and boulders or detached rock fragments which have a volume of ½ cubic yard or more. Boulders and detached fragments which have a volume of less than ½ cubic yard are considered Trench Excavation; Earth.

205.01.2 Trench Rock Excavation - Mechanical. This classification of trench rock excavation shall be employed in areas where blasting is prohibited. Trench rock excavated under this classification shall be removed by employing hydraulic splitters, air rams, paving breakers, or any other mechanical methods approved by the Engineer.

205.01.3 Ditches. Ditches at inlets and outlets of culverts and any other ditches and waterways, except those within normal cut and fill slopes, indicated in the Plans shall be excavated under the applicable trench excavation items.

205.02 MATERIALS. Not applicable.

205.03 CONSTRUCTION METHODS.

205.03.1 Excavation of Trenches. All unsuitable material shall be excavated to a minimum depth of 12 inches below the design invert elevation or as directed by the Engineer. For all pipe sizes up to 36 inches in diameter, the width of the trench shall extend 2 feet beyond each side of the inside diameter of the pipe. For pipe greater than 36 inches in diameter, trenches shall be excavated to 30 inches on each side of the inside diameter of the pipe.

The material to replace this excavation shall consist of suitable bedding placed and compacted under and around the pipe to the horizontal and vertical dimensions indicated on the Plans or stated in the Special Provisions. Bedding material may be from suitable trench or roadway excavation material. Backfill placed above the bedding may be from suitable trench or roadway excavation material, provided it meets the minimum requirements for Common Borrow. Common borrow will be used to replace unsuitable material when no excess suitable material is available from on-site.

The Contractor shall shape the surface of bedding material along the bottom of the trench to fit the bell of pipes to a depth equal to the thickness of the pipe or bell, as directed by the Engineer.

205.03.2 Trench Protection. Should trench protection be required in accordance with either OSHA Regulations or for the protection of the roadway or utilities, the Contractor will be required to provide adequate timber sheeting, steel sheeting or steel box type sheeting acceptable to the Engineer. Should the Contract specifically require trench protection of any nature for drainage trenches not requiring protection under OSHA Regulations, such use will be specified on the construction Plans.

Sheeting shall be either timber of 3-inch minimum thickness; steel sheet piling or a fabricated steel trench box. Except when fabricated steel trench boxes have been approved for use by the Engineer, the Contractor shall submit to the Engineer, for approval, shop drawings and computations showing the method and design of the sheeting proposed for use. Shop drawings shall be prepared and submitted in accordance with **Subsection 105.02; Plans and Shop Drawings**, of these Specifications.

Sheeting and supporting systems shall be designed to meet acceptable engineering criteria and must be certified by a Rhode Island Registered Professional Engineer. The Engineer's approval of shop drawings shall not relieve the Contractor of its responsibility under the Contract for successful completion of the work. The Engineer's written approval of a sheeting design will be required prior to the use of any sheeting on the project and prior to commencement of any drainage or underground utility work.

In all cases where sheeting is to be left in place, it shall be cut off a distance of 2 feet below subgrade unless otherwise required to support adjacent utilities and structures whose elevation is above the aforementioned cut off. The Contractor will not be allowed to use fabricated steel trench boxes where the Contract requires the use of either permanent steel or permanent timber sheeting.

The Contractor will be required to protect any and all structures (drainage or otherwise) and unsupported utilities encountered in the trench.

Unless otherwise indicated on the Plans or directed by the Engineer, all sheeting and bracing used in conjunction with trench excavation shall be removed by the Contractor following the completion of the work.

205.03.3 Open Cuts in Lieu of Trenches. Should the Contractor elect to excavate to the angle of repose as specified in OSHA 2226 (Excavation and Trenching Operations) and the lines of angle of repose intersect the ground beyond the pay limits of trench excavation as described subsequently in **Subsection 205.04.2**, any required additional excavation, disposal of unsuitable material, backfill, borrow, compaction, replacement of pavement structure, curb, sidewalk, lawn area, etc., will be completely at the Contractor's expense. All replacement work shall match the existing in kind. This provision is applicable only if the requirements for the Maintenance and Protection of Traffic are met to the satisfaction of the Engineer and when trench protection is not indicated on the Plans.

205.03.4 Dewatering. Trench excavation shall be maintained dry at all times and all construction work shall be performed in the dry unless otherwise directed by the Engineer. The Contractor shall remove by pumping, draining, bailing, well points, deep wells, or other approved method, any water which may accumulate in the trenches formed under this Contract and shall form all pump wells, sumps, dams, flumes, or other works required to keep the trenches clear of water while pipe and structures are being constructed.

The Contractor shall exercise caution to avoid loss of fines into bedding, boiling up of the trench bottoms, or other disturbances that may cause subsidence or loss of strength of the underlying natural

soils. If the dewatering procedure being used results in boiling, loss of fines, or other detrimental effects, the Contractor shall modify its operations to correct the situation. Damage caused by the dewatering operation will be repaired at the Contractor's expense.

All water from the trench excavations, including water discharged from pumping systems and underdrains, shall be removed and legally disposed of.

205.03.5 Backfill and Compaction. Backfill shall consist of suitable bedding and soil materials placed and compacted in layers. These layers shall be compacted to not less than 95 percent of maximum density according to AASHTO T180 and shall be no more than 8 inches thick after compaction.

Compaction shall be achieved in accordance with the applicable provisions of **Subsection 202.03.3** of these Specifications. Unless otherwise directed, the backfill shall be brought to the surface level of the surrounding ground and neatly graded.

No backfill shall be placed against newly constructed masonry or concrete structures unless authorized by the Engineer.

END OF SECTION

Section 31 23 34

DOT 204

TRIMMING AND FINE GRADING

204.01 DESCRIPTION. This work consists of the trimming and fine grading of all shoulders, ditches, side slopes, sidewalks, and subgrade whether in excavation or embankment. In the case of the subgrade surface, the work also includes the compaction of the surface upon which the pavement structure shall be placed. All such work shall be to the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

204.02 MATERIALS. Not applicable.

204.03 CONSTRUCTION METHODS. The areas to be graded shall be cleared of unsatisfactory material and shall then be compacted as directed within the areas of the proposed pavement structure.

A tolerance of a maximum of 1 inch, plus or minus, shall be allowed, provided that this plus or minus deviation from grade shall not continue for more than 100 feet in any direction.

Any depressions which may occur during compaction shall then be filled with additional suitable material. The surface shall then be regraded and compacted true to the lines and grades, as required.

The subgrade upon which the pavement structure and sidewalk are placed shall be graded and compacted to 95 percent of maximum density in accordance with **Subsection 202.03.3** of these Specifications. This operation shall be performed prior to pavement structure construction.

All slopes shall be graded and finished to conform with the lines and grades as indicated on the Plans.

Areas to be loamed shall be trimmed and graded to the lines and grades as indicated on the Plans or as directed.

END OF SECTION

SECTION 31 25 00

DOT 206

PERIMETER EROSION CONTROLS

206.01 DESCRIPTION. This work consists of the provision of perimeter erosion controls in reasonably close conformity with the dimensions and details indicated on the plans or as directed by the Engineer, all in accordance with these Specifications. Perimeter erosion controls consist of the following four types.

206.01.1 Baled Hay Erosion Checks. Baled hay erosion checks shall consist of baled hay or straw, each bale of which is embedded and attached to the ground with wood stakes, and are constructed as indicated on the Plans.

206.01.2 Silt Fence. Silt fencing shall consist of oak fence posts to which are attached industrial support netting and sediment control filter fabric, and are constructed as indicated on the Plans.

206.01.3 Baled Hay Erosion Check and Silt Fence Combined. Baled Hay Erosion Checks and silt fence combined shall consist of baled hay erosion check installed abutting the filter fabric side of a silt fence, with a minimum of six (6) inches along the bottom edge of the silt fence toed in under the baled hay erosion check as indicated on the Plans.

206.01.4 Compost Filter Sock. Compost filter sock shall consist of a flexible mesh tube filled with composted material and staked to the ground with wooden stakes, and constructed as indicated on the plans.

206.02 MATERIALS.

206.02.1 Baled Hay Erosion Checks. Baled hay or straw shall be baled within twelve months of use. Bindings shall be sufficiently strong to act as handles when placing bales in position by hand. The minimum dimension of any bale shall be 18 inches. Wood stakes shall be oak, 1-inch by 1- inch in section, and at least 3 feet in length.

206.02.2 Silt Fence. The filter fabric shall be a material suitable for erosion control applications and shall be one of those included on the Department's Approved Materials List. Wood posts shall be oak, 2-inch by 2-inch in section, and at least 4.5 feet in length. Support netting shall be heavy- duty plastic mesh. For prefabricated silt fence, 1-inch by 1-inch wood posts will be permitted.

206.02.3 Baled Hay Erosion Check and Silt Fence Combined. Baled Hay or straw shall conform to the requirements of **Subsection 206.02.1** above. Silt fencing shall conform to the requirements of **Subsection 206.02.2** above.

206.02.4 Compost Filter Sock. Compost filter sock material shall be in accordance with AASHTO Designation: MP 9-06 (2007 or latest revision). Compost filter material shall be in accordance with AASHTO Designation: MP 9-06 (2007 or latest revision). Compost material shall also meet all applicable Federal and State Regulations. For compost filter socks 18 inches or less in diameter, wooden stakes shall be 1 inch by 1 inch, at 10 foot intervals on center, and of a length that shall project into the soil 1 foot

leaving 3 inches to 4 inches protruding above the filter sock. For compost filter socks greater than 18 inches in diameter wooden stakes shall be 2 inch by 2 inch, at 10 foot intervals on center, and of a length that shall project into the soil 1 foot leaving 3 inches to 4 inches protruding above the filter sock.

206.03 CONSTRUCTION METHODS. Those erosion and pollution controls indicated on the Plans shall be installed and approved by the Engineer before the commencement of any drainage, roadway, or bridge construction.

206.03.1 Baled Hay Erosion Checks.

a. Installation. Baled hay erosion checks shall be constructed at the locations, and in accordance with the details indicated on the Plans, or as directed by the Engineer. The following stipulations also apply:

1. Bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another.

2. The erosion check shall be entrenched and backfilled. The trench shall be excavated the width of the bale and the length of the check to a minimum depth of 3 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the check. Backfill shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side.

3. The bales are to be installed so that the bindings are oriented around the sides of the bales rather than along their tops and bottoms.

4. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together.

5. The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between bales. Loose straw shall be scattered over the area immediately uphill from the bale erosion check to increase efficiency.

6. At approximate intervals of 100 feet, one bale is to be placed against those bales positioned along the limit of clearing. This bale is to be placed at a right angle to the line of the toe of slope, all as indicated on the Plans.

b. Removal. All stakes must be removed from the haybales at a time designated by the Engineer. In general, the bales will be allowed to rot in place. If the Contract requires the haybales to be removed, they may be removed only when the adjacent exposed area has been stabilized, i.e., the area has an established grass or stone cover or has been paved, and is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the haybales shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications. Immediately upon removal of the bales the remaining exposed areas (under the bales) will be backfilled, raked, and graded as necessary to match the surrounding grade and then seeded.

206.03.2 Silt Fence.

a. Installation. Silt fence shall be constructed at the locations, and in accordance with the details

indicated on the Plans, or as directed by the Engineer. The following stipulations also apply:

1. A 6-inch deep by 1-foot wide minimum trench shall be dug where the fence is to be installed.

2. The fence shall be positioned in the trench with the fence posts set at 8 feet on center (maximum) in wetland areas and 4 feet on center (maximum) in wetland ravine, gully or drop-off areas, as indicated on the plans.

3. The sedimentation control fabric and the industrial netting shall be stapled to each post. When joints are necessary, filter fabric shall be spliced together only at support posts. Splices shall consist of a 6-inch overlap, and shall be securely sealed.

4. Each wood post with industrial support netting and filter fabric attached shall be driven into the undisturbed soil in the trench as indicated on the Plans.

5. The trench shall be backfilled and the soil compacted over the filter fabric.

6. The installed height of the fence shall be 2½ feet (minimum). However, height shall not exceed 36 inches since higher barriers impound volumes of water sufficient to cause failure of the fence structure.

b. Removal. This work will include the removal of the silt fence erosion checks and posts. Silt fence will not be left to rot in place. The silt fence may be removed only when the adjacent exposed area is stabilized, i.e., the area has an established grass or stone cover or has been paved, and is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the silt fence shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications. Immediately upon removal of the silt fence the remaining exposed areas will be finished as specified above in **Para. b** of **Subsection 206.03.1**.

206.03.3 Baled Hay Erosion Check and Silt Fence Combined.

a. Installation. Baled Hay Erosion Check and Silt Fence Combined shall be installed in accordance with the requirements of **Para. a** of **Subsections 206.03.1** and **206.03.2**, with the following additional provisions:

1. Silt fencing shall be installed prior to the installation of the baled hay or straw.

2. The trench shall be a minimum of 6-inches deep and a width wide enough to accommodate the baled hay or straw as it abuts the filter fabric side of the silt fence.

3. Prior to backfilling the trench, the baled hay or straw shall be installed tight against the filter fabric side of the silt fence, with a minimum of six (6) inches of the bottom edge of the silt fence toed in under the baled hay within the trench.

b. Removal. This work will include the removal of the combined baled hay erosion check and silt fence in accordance with **Para. b** of **Subsections 206.03.1** and **206.03.2**, with the exception that the baled hay erosion checks will not be allowed to remain and rot in place.

206.03.4 Compost Filter Sock.

a. Installation. Compost Filter socks shall be constructed at the locations, and in accordance

with the details indicated on the plans, or as directed by the Engineer. The following stipulations also apply:

1. Compost filter socks may be either fabricated on site or delivered to the site.

2. Trenching is not required. Compost filter socks shall be placed over the top of ground, wooden stakes shall be driven through the center of the filter socks to anchor them to the ground. To ensure optimum performance, heavy vegetation shall be cut down or removed, and extremely uneven surfaces shall be graded to ensure that the compost filter sock uniformly contacts the ground surface.

3. Filter socks shall be placed in a continuous line. Where ends intersect they shall be sleeved to create an interlock with a two (2) foot overlap. After one section is filled and the ends tied off, the next section shall be pulled over the tied-off end of the previous section, to create a 2-foot overlap. The overlap shall be staked. The intersecting overlaps shall be constructed to ensure that stormwater does not break through at these intersection points.

b. Removal. This work, if required, shall include the removal of the compost filter sock and stakes. Unless biodegradable, the mesh filter sock material shall be cut open and the mesh removed. In general, the compost filter material may be left in place, however the material will be raked out leveled to surrounding grades, then seeded. Prior to such removal, however, all silt, mud and debris entrapped outside of the compost filter sock shall be removed and the area cleaned up in accordance with the applicable provisions of **Section 212** of these Specifications. Immediately upon removal of the compost filter socks the remaining exposed areas will be finished as specified in **Para. b of Subsection 206.03.1**.

END OF SECTION

SECTION 31 25 24

DOT207

STRUCTURAL MEASURES FOR EROSION AND SEDIMENTATION CONTROL

207.01 DESCRIPTION. This work consists of the provision of check dams and dikes in reasonably close conformity with the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. Check dams consist of the following four types:

207.01.1 Baled Hay Ditch and Swale Erosion Checks. Baled hay ditch and swale erosion checks consist of baled hay or straw, each bale of which is embedded and attached to the ground with wood stakes, and constructed as indicated on the Plans.

207.01.2 Log and Hay Check Dams. Log and hay check dams consist of baled hay placed inside a log enclosure and held in place and otherwise stabilized by the placement of stones, and constructed as indicated on the Plans.

207.01.3 Sand Bag Erosion Dikes. This work consists of the placement of sand bags across either riprap or earth ditches, thereby forming a dike, to create temporary stilling basins for pollution control, and constructed as indicated on the Plans.

207.01.4 Stone Check Dams. This work consists of the placement of stone in ditches or drainage swales, and constructed as indicated on the Plans.

207.01.5 Compost Filter Sock Ditch and Swale Erosion Checks. Compost filter sock ditch and swale erosion checks shall consist of a flexible mesh tube filled with composted material and staked to the ground with wooden stakes, and constructed as indicated on the plans.

207.02 MATERIALS.

207.02.1 Baled Hay Ditch and Swale Erosion Checks. Baled hay or straw shall be baled within twelve months of use. Bindings shall be sufficiently strong to act as handles when placing bales in position by hand. The minimum dimension of any bale shall be 18 inches. Wood stakes shall be oak, 1-inch by 1-inch in section, and at least 3 feet in length.

207.02.2 Log and Hay Check Dams. Baled hay or straw shall conform to the requirements of **Subsection 207.02.1**, above. Wire spikes shall be of a quality acceptable to the Engineer. Crushed stone shall meet the requirements of **Subsection M.01.09; Table I, Column II** of these Specifications. Other natural materials such as rocks and cut logs shall both conform to the dimensions and sizes indicated on the Plans and be acceptable to the Engineer.

207.02.3 Sand Bag Erosion Dikes. The sand bags and the sand material shall be of a quality acceptable to the Engineer. Dumped stone, when required, shall meet the requirements of **Subsection M.10.03.2** for Modified NSA Class R-4 riprap. The filled sand bags will weigh a minimum of 60 pounds.

207.02.4 Stone Check Dams. The stone shall meet the requirements of **Subsection M.01.09, Table I,**

Column V for Filter Stone.

207.02.05 Compost Filter Sock Ditch and Swale Erosion Checks. Compost filter sock material shall be in accordance with AASHTO Designation: MP 9-06 (2007 or latest revision). Compost filter material shall be in accordance with AASHTO Designation: MP 9-06 (2007 or latest revision). Compost material shall also meet all applicable Federal and State Regulations. For compost filter socks 18 inches or less in diameter, wooden stakes shall be 1 inch by 1 inch, and of a length that shall project into the soil 1 foot leaving 3 inches to 4 inches protruding above the filter sock. For compost filter socks greater than 18 inches in diameter wooden stakes shall be 2 inch by 2 inch and of a length that shall project into the soil 1 foot leaving 3 inches to 4 inches protruding above the filter sock. Stakes shall be placed at the ends and at 5 foot intervals, on center.

207.03 CONSTRUCTION METHODS. Those erosion and pollution controls indicated on the Plans shall be installed and approved by the Engineer before the commencement of any drainage, roadway or bridge construction.

207.03.1 Baled Hay Ditch and Swale Erosion Checks.

a. Installation. Erosion checks shall consist of two or more bales placed and staked perpendicular to the flow line of a ditch formed by the intersection of its slopes and constructed as indicated on the Plans. The following stipulations also apply:

1. A pair of erosion checks shall be placed a minimum of 12 feet apart at each location.

2. The ditch erosion checks shall be entrenched and backfilled. The trench shall be excavated the width of the bale(s) and the length of the check to a minimum depth of 3 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the check. Backfill shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side.

3. The bales are to be installed so that the bindings are oriented around the sides of the bales rather than their tops and bottoms.

4. The edges of overlapped bales shall overlap in such a manner that there will be no opening between the bales. Where bales butt together the gap between bales shall be chinked with loose straw to prevent water from escaping.

5. Each bale shall be securely anchored by a least two stakes driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together.

6. All earth ditch areas are required to have the protection of baled hay ditch erosion checks prior to their outfall onto existing ground, or natural or man-made water courses.

7. The haybale barrier shall be extended such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale. This configuration will insure that the sediment laden runoff will flow either through or over the barrier, but not around it.

b. Removal. Bales of hay used in this work will not normally be left to rot in place. The bales may be removed only when the adjacent exposed area is stabilized, i.e., the area has an established grass or stone cover or has been paved, and is free from future uncontrolled discharges. Prior to such removal,

however, all silt, mud, and debris entrapped by the respective erosion checks shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications. Immediately upon removal of the bales, the remaining exposed areas (under the bales) will be backfilled, raked, and graded as necessary to match the surrounding grade and then seeded.

207.03.2 Log and Hay Check Dams.

a. Installation. Log and hay check dams will be constructed perpendicular to the stream flow line. The bales of hay shall be placed between 18-inch log walls, nailed, braced and weighted with stone as indicated on the Plans.

b. Removal. Log and hay check dams will be removed prior to the completion of the project at a time designated by the Engineer. Prior to such removal, however, all silt, mud, and debris entrapped by the check dam shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications. Immediately upon removal of the check dams, the exposed and disturbed areas will be backfilled, raked, and graded as necessary to match the surrounding area and then seeded.

207.03.3 Sand Bag Erosion Dikes.

a. Installation. Sand bag erosion dikes shall be constructed as indicated on the Plans. The sand bags will be placed a minimum of four layers high. Over the center of the ditch the top layer of sand bags will have a weir opening equal to one half the bottom ditch width. The sand bags shall be extended such a length that the bottom of the end sand bags are higher in elevation than the top of the lowest middle sand bag.

When the sand bag dike is constructed across an earth ditch, the down stream side of the dike at the weir opening is to be protected with Modified NSA Class R-4 dumped riprap.

b. Removal. Sand bag erosion dikes will be removed prior to the completion of the project at a time designated by the Engineer. Prior to such removal, however, all silt, mud, and debris entrapped by the erosion dike shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications.

207.03.4 Stone Check Dams.

a. Installation. Stone check dams shall be constructed as indicated in on the Plans. The stone shall be placed across the ditch or swale to achieve complete coverage and shaped to the required configuration by the use of hand tools. The stone shall be sloped from the sides of the ditch/swale towards the center such that the center is 6 inches lower than the stone at the sides of the ditch/swale. The check dam shall have 2-horizontal to 1-vertical side slopes and shall not exceed 2 feet in height.

b. Removal. Stone check dams will be removed prior to the completion of the project at a time designated by the Engineer. Prior to such removal, however, all silt, mud and debris entrapped by the check dam shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications.

207.03.5 Compost Filter Sock Ditch and Swale Erosion Checks.

a. Installation. Compost Filter sock ditch and swale erosion checks shall be constructed at the

locations, and in accordance with the details indicated on the plans, or as directed by the Engineer. The following stipulations also apply:

1. Compost filter sock ditch and swale erosion checks may be either fabricated on site or delivered to the site.

2. Trenching is not required. Compost filter sock ditch and swale erosion checks shall be placed over the top of ground, wooden stakes shall be driven through the center of the filter socks to anchor them to the ground. To ensure optimum performance, heavy vegetation shall be cut down or removed, and extremely uneven surfaces should be graded to ensure that the compost filter sock uniformly contacts the ground surface. These may be placed over the top of rolled erosion controls mats or turf re-enforcement mats. These may also be stacked if additional height is needed.

3. Compost filter sock ditch and swale erosion checks shall be installed perpendicular to flow. This erosion check shall extend to such a length that the bottoms of each end are higher in elevation than the lowest middle part or the top of the banks (maximum flow line) are reached.

b. Removal. This work, if required, shall include the removal of the compost filter sock and stakes. Unless biodegradable, the mesh filter sock material shall be cut open and the mesh removed. In general, the compost filter material may be left in place, however the material shall be raked out leveled to surrounding grades, then seeded. Prior to such removal, however, all silt, mud and debris entrapped by the compost filter sock shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications. Immediately upon removal of the compost filter socks the remaining exposed areas will be finished as specified in **Para. b of Subsection 206.03.1**.

END OF SECTION

SECTION 31 25 25

DOT 208

TEMPORARY DEWATERING BASINS

208.01 DESCRIPTION. This work consists of the provision of temporary dewatering basins for the purpose of controlling water pollution caused by sediment-laden discharge from excavation sites. The basins shall be constructed in reasonably close conformity with the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. Temporary dewatering basins consist of the following two types:

208.01.1 Dewatering Basin. The basin consists of a rectangular concrete barrier enclosure, the bottom and sides of which are lined with filter fabric. The bottom fabric is stabilized with filter stone. The basin is divided into the required number of 12-foot sections by stone berms approximately 18 inches high. The entire unit is constructed as indicated on the Plans.

208.01.2 Filter Fabric Retention Basin. The basin consists of a rectangular enclosure formed by a 2-foot high chain link fence. Both the fence and the bottom of the enclosure are lined with filter fabric which is stabilized by a layer of rock riprap. The entire unit is constructed as indicated on the Plans.

208.02 MATERIALS.

208.02.1 Dewatering Basins. Precast concrete barrier units shall conform to details indicated on the Plans and to the applicable requirements of **SECTION 909** of these Specifications. Filter fabric shall conform to the applicable requirements of **Subsection 206.02.2; Silt Fence**, of these Specifications. Filter stone shall conform to the requirements of **Subsection M.01.09, Table I, Column V** of these Specifications. Sand bags shall be of a quality acceptable to the Engineer. Hay bales and wood stakes shall conform to the requirements of **Subsection 206.02.1** of these Specifications.

208.02.2 Filter Fabric Retention Basins. The fence shall conform to the requirements for Type I Chain Link Fence as set forth in **SECTION 903** of these Specifications. Wood posts shall be 2-inch by 2-inch oak and at least 3 feet in length. Filter fabric shall conform to the requirements for same as set forth in **Subsection 206.02.2** of these Specifications. The layer of stone over the bottom of the basin shall meet the requirements of **Subsection M.10.03.2** for Modified NSA Class R-4 riprap.

208.03 CONSTRUCTION METHODS. Those erosion and pollution controls indicated on the Plans shall be installed and approved by the Engineer before the commencement of any drainage, roadway, or bridge construction.

208.03.1 Dewatering Basin.

a. Installation. Dewatering basins shall be constructed at the locations, and in accordance with the details indicated on the Plans, or as directed by the Engineer. The following stipulations shall also apply:

1. The precast concrete barrier units shall be placed on level, or nearly level, ground.

2. Filter fabric shall be placed on the bottom of the entire area enclosed by the concrete barrier units. If more than one sheet of fabric is required, the adjacent section shall be overlapped a minimum of 12 inches to insure full coverage. Filter fabric shall be turned up along the inside face of the concrete barriers to the top of same, there to be folded across the top of the barriers. The fabric will be maintained in position by the placement of sand bags, end-to-end, along the top of the concrete barrier enclosure.

3. A minimum layer of 6 inches of filter stone shall be spread over the bottom of the basin. Stone berms shall be constructed at 12-foot intervals along the length of the basin.

b. Removal. The dewatering basin will not be removed until all dewatering operations are complete. Prior to such removal, however, all accumulated sediment within the basin shall be removed and legally disposed of in accordance with the applicable requirements of **SECTION 212** of these Specifications. The area covered by the basin shall be seeded and mulched immediately after the basin is removed.

208.03.2 Filter Fabric Retention Basin.

a. Installation. Retention basins shall be constructed at the locations, and in accordance with the details indicated on the Plans, or as directed by the Engineer. The following stipulations shall also apply:

1. The filter fabric retention basin will be placed on stabilized and level, or nearly level, ground to prevent erosion by water exiting the basin.

2. A 6-inch by 6-inch minimum trench shall be dug where the basin is to be constructed.

3. The filter fabric and wire backing shall be 3 feet wide (minimum) positioned in the trench and secured to metal posts positioned 4 feet on center (maximum).

4. The metal posts shall be driven into undisturbed soil next to the trench to a minimum depth of 12 inches.

5. Place fill material in the trench and compact.

6. The installed height of the fence shall be 2 feet (minimum).

7. A minimum layer of 6 inches of filter stone (Modified NSA Class R-4 riprap) shall be spread evenly over the bottom of the basin.

b. Removal requirements for the filter fabric retention basin are the same as set forth above for the dewatering basin.

END OF SECTION

SECTION 31 2524.10

DOT 209

STORM DRAIN PROTECTION

209.01 DESCRIPTION. This work consists of the provision of temporary storm drain protection facilities constructed in reasonably close conformity with the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. Storm drain protection facilities consist of the following three types.

209.01.1 Sandbag Gutter Inlet Sediment Barrier. This work consists of placing a sandbag barrier upstream of a gutter inlet prior to the placement of roadway pavement. Sediment barriers shall be constructed as indicated on the Plans.

209.01.2 Silt Fence Catch Basin Inlet Protection. This work consists placing a temporary filter fabric fence around inlet grates. Silt fence inlet protection shall be constructed as indicated on the Plans.

209.01.3 Baled Hay Catch Basin Inlet Protection. This work consists of placing baled hay around catch basin inlets. Baled hay inlet protection shall be constructed as indicated on the Plans.

209.02 MATERIALS.

209.02.1 Sandbag Gutter Inlet Sediment Barrier. The sandbags and the sand material shall be of a quality acceptable to the Engineer.

209.02.2 Silt Fence Catch Basin Inlet Protection. The filter fabric shall be a material suitable for erosion control applications and shall be one of those included on the Department's Approved Materials List. Wood posts shall be oak, 2-inch by 2-inch in section, and at least 4½ feet in length. Support netting shall be heavy-duty plastic mesh. For prefabricated silt fence, 1-inch by 1-inch wood posts will be permitted.

209.02.3 Baled Hay Catch Basin Inlet Protection. Baled hay or straw and wood stakes shall conform to the requirements of **Subsection 206.02.1** of these Specifications.

209.03 CONSTRUCTION METHODS. Those erosion and pollution controls indicated on the Plans shall be installed and approved by the Engineer before the commencement of any drainage, roadway, or bridge construction.

209.03.1 Sandbag Gutter Inlet Sediment Barrier.

a. Installation. Sandbag sediment barriers shall be constructed as indicated on the Plans. The following stipulations shall also apply:

1. The sandbags will be placed in a curved row extending from the curb or berm. The row shall be at least 6 feet upstream of the inlet and should overlap the curb or berm.

2. Place several layers of sandbags over the first layer to a height of at least 1 foot. The bags shall be overlayed and packed tightly together.

3. A gap of one sandbag should be left in the middle of the top row to serve as a spillway. The spillway shall be a least 8 inches high.

4. Additional sediment storage capacity can be obtained by constructing a series of these barriers along the gutter upstream of the inlet.

b. Removal. The sandbag sediment barrier will be removed prior to the completion of the project at a time designated by the Engineer. Prior to such removal, however, all silt, mud, and debris entrapped by the sediment barrier shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications.

209.03.2 Silt Fence Catch Basin Inlet Protection.

a. Installation. The silt fence inlet protection shall be constructed as indicated on the Plans. The following stipulations shall also apply:

1. Posts shall extend at least 1 foot below grade.

2. The filter fabric shall extend to a height at least 12 inches above the top of the inlet grate, but shall not exceed 3 feet in height.

3. The support netting shall extend to the full height of the filter fabric.

4. A trench shall be excavated approximately 6 inches wide and 6 inches deep around the outside perimeter of the stakes. The filter fabric and support netting shall extend at least 6 inches into the trench. After the fabric and support netting are fastened to the stakes the trench should be backfilled and compacted to original grade.

5. The filter fabric and support netting fence shall be securely fastened to the stakes using heavy duty wire staples at least 1 inch long. Ends of the filter fabric must meet at a stake, be overlapped, folded and stapled to the stake.

b. Removal. The silt fence inlet protection shall be removed and the area prepared for pavement construction once the contributing drainage area is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the silt fence shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications.

209.03.3 Baled Hay Catch Basin Inlet Protection.

a. Installation. The baled hay inlet protection shall be constructed as indicated on the Plans. The following stipulations shall also apply:

1. The bales shall be entrenched and backfilled. The trench shall be excavated the width of the bale and the length of the check to a minimum depth of 3 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the check. Backfill shall conform to the ground level on the

inside and shall be built up to 4 inches around the outside.

2. The bales are to be installed so that the bindings are oriented around the sides of the bales rather than along their tops and bottoms.

3. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together.

4. The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between bales.

b. Removal. The baled hay inlet protection shall be removed and the area prepared for pavement construction the contributing drainage area is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the baled hay shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications.

END OF SECTION

SECTION 31 25 34

SECTION 210

STILLING BASINS FOR WATER POLLUTION CONTROL

210.01 DESCRIPTION. This work consists of the provision of temporary and/or permanent stilling basins in reasonably close conformity with the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

210.02 MATERIALS. The various materials required for the construction of stilling basins will be indicated on the Plans.

210.03 CONSTRUCTION METHODS. The stilling basins will be constructed in such a manner to allow any material which may cause a natural water course or the surrounding environment to be damaged to be retained in the basin. During the life of the Contract, the Contractor will be required to periodically clean the pool and to maintain the basin, both as directed by the Engineer. If the basin is temporary, the Contractor will be required to fill the basin with suitable material and to restore the area in which the basin was located to either its original condition or to the requirements of the Contract.

In all cases the stilling basins are to be constructed immediately after the clearing and grubbing operation and before commencement of any excavation and/or embankment. The single exception to this requirement is the construction of a leveling course to create a work platform. Excavation for stilling basins is to take place from the downstream end of the basin and to proceed upstream. Prior to the start of excavation, temporary baled hay ditch erosion checks and/or hay log check dams are to be constructed immediately beyond the downstream end of the basin. When the basin is complete, the above temporary erosion control measures are to be removed.

END OF SECTION

SECTION 31 26 00

DOT 211

CONSTRUCTION ACCESS

211.01 DESCRIPTION. This work consists of the provision of stabilized stone pads located at points of vehicular ingress and egress on construction sites.

211.01.1 Planning Considerations. Public roads adjacent to a construction site shall be clean at the end of each day. This **SECTION 211** provides for an area where mud can be removed from the tires of construction vehicles before such vehicles enter a public road. The action of vehicles traveling over a stabilized stone pad will remove most of the mud from tires. Construction accesses shall be used in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by construction vehicles.

211.02 MATERIALS. Crushed stone shall conform to the requirements of **Subsection M.01.09, Table I, Column II** of these Specifications. Filter fabric shall conform to the requirements for same as set forth in **Subsection 206.02.2** of these Specifications.

211.03 CONSTRUCTION METHODS. Stabilized stone pads employed as construction entrances shall be constructed as indicated on the Plans.

211.03.1 Entrance Dimensions.

a. Thickness. The thickness of the stabilized stone pad shall be a minimum of 5 inches.

b. Width. The width shall not be less than the full width of the respective points of ingress or egress.

c. Length. The length of construction entrances shall be at least 50 feet where the soils are sands or gravels, except where the traveled length is less than 50 feet. Where soils are clays or silts, the length of construction entrances shall be at least 100 feet except where the traveled length is less than 100 feet.

211.03.2 Installation Requirements. The area of the construction entrance shall be cleared of all vegetation, roots, stumps, or other objectionable material. The area shall then be excavated to subgrade and graded. Filter fabric shall be placed on the prepared subgrade prior to the placement of the stone pad. The stone shall be placed according to the specified dimensions.

SECTION 31 27 00

DOT 212

MAINTENANCE AND CLEANING OF EROSION AND POLLUTION CONTROLS

212.01 DESCRIPTION. This work consists of the maintenance and cleaning of erosion and pollution control facilities in accordance with these Specifications and as directed by the Engineer.

212.01.1 Applicable Controls. The specific erosion and pollution control facilities to be cleaned and maintained under this Section consist of the following:

a. Perimeter Controls.

1.	Baled Hay Erosion Checks;	Subsection 206.01.1
2.	Silt Fence;	Subsection 206.01.2

	3.	Compost filter sock	Subsection 206.01.4
b.	**Check Dams.**		
	1.	Baled Hay Ditch and Swale Erosion Checks;	Subsection 207.01.1
	2.	Log and Hay Check Dams;	Subsection 207.01.2
	3.	Sand Bag Erosion Dikes;	Subsection 207.01.3
	4.	Stone Check Dams;	Subsection 207.01.4
	5.	Compost Filter Sock Ditch and Swale Erosion Checks	Subsection 207.01.5
c.	**Temporary Dewatering Basins.**		
	1.	Dewatering Basins;	Subsection 208.01.1
	2.	Filter Fabric Retention Basins;	Subsection 208.01.2
d.	**Storm Drain Protection.**		
	1.	Sandbag Gutter Inlet Sediment Barrier;	Subsection 209.01.1
	2.	Silt Fence Catch Basin Inlet Protection;	Subsection 209.01.2
	3.	Baled Hay Catch Basin Inlet Protection;	Subsection 209.01.3
e.	**Stilling Basins.**		Subsection 210.01

212.01.2 Definitions.

a. Cleaning. Cleaning consists of removing debris and accumulated sediment-laden deposits from the upstream side of perimeter controls, check dams and temporary drainage protection **and** from the bottom of temporary dewatering basins and stilling basins. All material so- removed shall be legally disposed of.

b. Maintenance. Maintenance consists of the restoration and repair of damage sustained by erosion and pollution controls from "normal" rainfall events (Abnormal weather events are defined in **Subsection 212.03.4; Failure of Erosion and Pollution Controls**).

212.02 MATERIALS. Materials required to repair and restore damaged erosion and pollution controls shall meet the applicable requirements of **Subsections 206.02; 207.02; 208.02; 209.02; and 210.02; for Perimeter Erosion Controls, Check Dams, Temporary Dewatering Basins, Storm Drain Protection,**

and Stilling Basins, respectively, of these Specifications.

212.03 CONSTRUCTION METHODS. Erosion and pollution controls shall be maintained by the Contractor to the satisfaction of the Engineer. Erosion and pollution controls must be able to prevent, under normal weather conditions, both the movement of soil materials and the intrusion of sediment-laden discharges into environmentally sensitive areas.

Construction shall not commence or continue until all specified erosion and pollution controls are in place, properly installed and accepted by the Engineer.

Erosion and pollution controls shall be routinely inspected by the Engineer. The Engineer shall immediately notify and direct the Contractor to take corrective action and make all necessary repairs whenever maintenance of the erosion and pollution controls is required. The Contractor shall commence with the requisite cleaning and maintenance measures no later than the next consecutive calendar day after receiving such a directive from the Engineer, and shall aggressively and expeditiously perform such cleaning and maintenance work until the original problem is remedied to the complete satisfaction of the Engineer. In the event of a holiday or weekend storm event, the Contractor must have resources available to restore and, if necessary, to replace any damaged erosion controls.

212.03.1 Threshold for Cleaning Erosion Controls. Erosion and pollution controls will be cleaned when directed by the Engineer; after a rainstorm; and when sediment deposits reach the heights indicated in the following table:

a. Perimeter Controls		**Height**
1.	Baled Hay Erosion Checks	½ Bale Height
2.	Silt Fence	6 inches
3.	Compost filter sock	½ the compost filter sock height
b. Check Dams		
1.	Baled Hay Erosion Checks	½ Bale Height
2.	Log and Hay Check Dams	½ Bale Height
3.	Sand Bag Erosion Dike	½ Dike Height
4.	Stone Check Dam	½ Dam Height
5.	Compost filter sock	½ the compost filter sock height
c. Temporary Dewatering Basins		
1.	Dewatering Basins	½ Original Basin Height
2.	Filter Fabric Retention Basin	½ Original Basin Height
d. Storm Drain Protection		

1.	Sandbag Gutter Inlet Sediment Barrier	½ Dike Height
2.	Silt Fence Catch Basin Inlet Protection	6 inches
3.	Baled Hay Catch Basin Inlet Protection	½ Bale Height

e. Stilling Basins ½ Depth Below Outlet Elevation

212.03.2 Other Requirements.

a. Perimeter Controls, Check Dams and Storm Drain Protection. The following requirements apply:

1. Damaged controls will be repaired or replaced after each storm events or as directed by the Engineer.

2. Before controls are removed all accumulated sediment on the upstream side shall be removed and legally disposed of.

3. Erosion controls shall not be removed until the adjacent exposed areas are relatively free from future uncontrolled discharges.

4. The Engineer has the authority to verify, enforce, and to specify maintenance activities and to ensure that erosion and pollution controls have been properly maintained.

b. Temporary Dewatering Basins and Stilling Basins. The following requirements apply:

1. The basins will be periodically inspected for signs of erosion around the basin and downslope area.

2. Repairs will be promptly carried out as directed by the Engineer.

3. The Engineer has the authority to verify, enforce, and to specify maintenance activities and to ensure that controls have been properly maintained.

212.03.3 Failure to Maintain Erosion and Pollution Controls. If the Engineer decides on any given day that those erosion and pollution controls specified in the Contract are not in place or have not been adequately maintained as specified in this Section, the daily charge set forth in **Special Provision Code 212.1000** will be deducted from monies due the Contractor as a charge for failure to comply with this Specification. Moreover, the stated daily charge will continue each consecutive calendar day thereafter until the deficiencies noted have been corrected to the complete satisfaction of the Engineer.

212.03.4 Failure of Erosion and Pollution Controls. This **SECTION 212; MAINTENANCE AND CLEANING OF EROSION AND POLLUTION CONTROLS**, is based on the concept that erosion and

pollution controls will essentially remain intact under normal rainfall events and that any damage sustained by said controls under normal rainfall may be repaired under the maintenance provisions set forth herein.

However, under abnormal weather events it is possible that erosion and pollution controls may be damaged to the extent that the Engineer may direct that they be replaced in their entirety. Under such abnormal conditions the Contractor will replace the particular facilities, and be compensated for same, under the applicable provisions of **SECTIONS 206, 207, 208, 209 and 210; PERIMETER CONTROLS, CHECK DAMS, TEMPORARY DEWATERING BASINS, STORM DRAIN PROTECTION, and STILLING BASINS,** respectively, of these Specifications.

a. Abnormal Weather Conditions. For the purposes of this **Subsection 212.03.4**, abnormal weather events are defined as follows:

1. For a duration of 1 hour; rainfall equal to or greater than ½-inch.

2. For a duration of 12 hours; rainfall equal to or greater than 2 inches.

3. For a duration of 24 hours; rainfall equal to or greater than 3 inches.

4. Extreme weather conditions such as hurricanes, tornadoes, floods, blizzards, etc.

Daily rainfall records may be obtained from the National Weather Service.

END OF SECTION

SECTION 32 12 00

DOT 401

DENSE GRADED HOT MIX ASPHALT (HMA) PAVEMENTS

401.01 DESCRIPTION. This work consists of constructing HMA pavements on prepared foundations in conformity with the dimensions and details indicated on the Plans, and in accordance with these Specifications. These Specifications are applicable to all types of Dense Graded HMA pavements irrespective of aggregate gradation, grade of performance graded asphalt binder (PGAB), or pavement use.

All work and materials shall meet applicable sections of RI Standard Specifications.

401.02 MATERIALS.

401.02.1 Aggregates. Aggregates shall meet the applicable requirements of **Subsection M.** of RI Standard specifications and AASHTO M 323

Depth of materials shall be measured after thorough compaction. Base course to be compacted to 95% modified proctor.

a) Base Course - The Base Course shall consist of twelve (12) inches Crushed stone or processed gravel bedding which conforms to the requirements of subsection M.01 of the RI Standard Specifications plus the following:

   a. Crushed Stone or Crushed Gravel meeting Type II gradation section M01.09,

c) The Binder Course shall consist of two inches (4”) of Bituminous Concrete Pavement (hot mix) Class 19 conforming to the requirements of subsection M.03. of the RI Standard Specifications.

d) The Surface Course shall consist of two inches (2”) of Bituminous Concrete Pavement (hot mix) Class 12.5, conforming to the requirements of subsection M.03. of the RI Standard Specifications.

END OF SECTION

SECTION 32 1210

DOT 931

CLEANING AND SWEEPING PAVEMENT

931.01 DESCRIPTION. This work consists of cleaning and sweeping surfaces of bituminous concrete pavement and cement concrete pavement designated on the Plans or as directed by the Engineer to remove materials deposited on said pavements during extended delays in construction operations, all in accordance with these Specifications. These delays include, but are not limited to, suspension of construction operations during the winter months and the interruption of construction operations for extended lengths of time between the placement of successive courses of bituminous concrete pavement. Two items of work are covered by this Section.

931.01.1 Cleaning and Sweeping Pavement. This work consists of cleaning and sweeping the entire roadway surface and/or gutter area. The sweepings must be removed prior to the placement of any successive pavement.

931.01.2 Cleaning and Sweeping Pavement for Statewide Striping Contracts. The work consists of cleaning and sweeping limited areas of roadway surface for the sole purpose of preparing said pavement to receive striping and markings. The work shall be performed simultaneously with, and in advance of the striping operation. All sweeping operations will be performed at the discretion of the Engineer.

931.02 MATERIALS. Not applicable.

931.03 CONSTRUCTION METHODS. All sands, silts, gravels, vegetation, and debris of every description shall be removed from the designated areas by approved mechanical or manual sweeping methods. All such material shall be removed to the complete satisfaction of the Engineer prior to either resurfacing, placing wearing surface courses, or placement of striping and markings, as the case may be.

931.03.1 Disposal of Collected Debris. The legal disposal of all collected material shall be accomplished as follows.

a. Street Sweepings. This debris includes sand that may be mixed with salt used on streets, roads, highways for winter storm operation.

1. Acceptable Uses. Street sweepings may be reused in the following ways:

(a) Landfill Cover (may require screening).

(b) Road Base, or any base course application that will be covered with an asphalt or concrete layer.

(c) Backfill for public works construction projects other than areas adjacent to concrete pipes and structures.

(d) Clean fill, only when analytical testing for Total Petroleum Hydrocarbons (TPH),

Toxicity Characteristic Leaching Procedure (TCLP), and Total Lead (TL) have been performed and submitted to RIDEM, Division of Waste Management, for review of reuse application.

2. Unacceptable Uses. Street sweepings may not be used as unrestricted clean fill in areas that will expose the debris to human contact such as:

(a) Fill on residential properties, public parks or playgrounds.

(b) Fill near pristine waterways, drinking water watersheds, wellhead protection areas, areas with groundwater classified as GAA, and areas within 200 feet of a private drinking water well, or in any other manner that would be inconsistent with State and Federal laws or regulations.

b. Other Debris. All other debris collected from the roadway surface shall be legally disposed of.

END OF SECTION

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SECTION 32 12 20

DOT 932

CUTTING AND MATCHING PAVEMENT

932.01 DESCRIPTION. This work consists of cutting back and matching cuts in both Portland cement and bituminous concrete pavements to the required depths of the specified course, or courses, at the locations indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

932.01.1 Cold Joints. This work also includes the installation of cold joints if such joints occur during paving operations.

932.02 MATERIALS. Not applicable.

932.03 CONSTRUCTION METHODS. The method of cutting shall be approved by the Engineer prior to the commencement of construction operations. The sections of existing pavement to be removed, surface course, base course, or combination thereof, shall be cut along the neat lines shown on the Plans or as directed by the Engineer. A vertical cut of at least 2½-inches deep shall be made along the designated lines. The pavement to be removed shall then be chipped and removed. The edge of the cut joint shall be thoroughly cleaned by sweeping and blowing with compressed air. The clean edge shall then be protected by adequate measures until the new pavement is placed and matched thereto.

Any existing pavement, surface course, base course, or combination thereof, beyond the neat lines called for on the Plans that is damaged or destroyed by the Contractor's operations shall be either repaired or replaced at no additional cost to the State.

932.04 Cold Joints. If, as a result of paving operations, a cold joint occurs, the Contractor will install the joints as directed by the Engineer.

SECTION 32 131 3

DOT 501

PORTLAND CEMENT CONCRETE PAVEMENT AND BASE

501.01 DESCRIPTION. This work consists of constructing Portland cement concrete base or pavement, with or without reinforcement, on a prepared subgrade or subbase in reasonably close conformity with the dimensions and details indicated on the Plans, all in accordance with these Specifications.

501.02 MATERIALS. Materials shall meet the requirements of **SECTION M.02; PORTLAND CEMENT CONCRETE** and **SECTION M.05; METALS**, of these Specifications.

501.03 CONSTRUCTION METHODS.

501.03.1 Construction Requirements. The classifications, proportioning, testing, batching, mixing, handling, placing, finishing and curing of Portland cement concrete pavement or base shall conform to the applicable requirements of **SECTION 601; PORTLAND CEMENT CONCRETE,** of these Specifications.

501.03.2 Equipment.

a. Finishing Machines. Equipment for finishing concrete pavement shall be mechanical, self-propelled, spreading and finishing machines capable of consolidating the concrete and producing a finished surface as specified herein. Finishing machines shall be equipped with at least two oscillating type transverse screeds which shall be adjustable to produce a crowned or flat surface as required.

b. Vibrators. Vibrators, for full width vibration of concrete paving, may be either the surface pan type or the internal types with either immersed tube or multiple spuds. They may be attached to the spreader or the finishing machine, or may be mounted on a separate carriage to accommodate either slip form or side form paving methods. They shall not come in contact with the joint, load transfer devices, subgrade, reinforcing, or side forms. The frequency of the surface vibrators shall not be less than 3,500 impulses per minute and the frequency of the internal type shall not be less than 5,000 impulses per minute for tube vibrators and not less than 7,000 impulses per minute for spud vibrators.

Vibrators shall be rubber tipped to prevent damage to epoxy-coated reinforcing steel.

c. Concrete Saw. When sawing joints is elected or specified, the Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing with a water- cooled diamond edge saw blade or an abrasive wheel to the required dimensions and at the required rate. The Contractor shall provide at least one standby saw in good working order. An

ample supply of saw blades shall be maintained at the site of the work at all times during sawing operations. The Contractor shall provide adequate artificial lighting facilities for night sawing.

d. Forms. Straight side forms shall be made of a metal having a thickness of not less than 7/32-inch and shall be furnished in sections not less than 10 feet in length. Forms shall have a depth equal to or greater than the prescribed edge thickness of the concrete, without horizontal joint, and a base width equal to or

greater than the depth of the forms. Flexible or curved forms of proper radius shall be used for curves of 100-foot radius or less. Flexible or curved forms shall be of a design acceptable to the Engineer. Forms shall be provided with adequate devices for secure setting so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Flange braces shall extend outward on the base not less than two-thirds the height of the form. Forms with battered top surfaces, and bent, twisted, or broken forms shall be removed from the work. Repaired forms shall not be used until inspected and approved by the Engineer. Built-up forms shall not be used except where the total area of pavement of any specified thickness on the project is less than 2,000 square yards. The top face of the form shall not vary from a true plane more than 1/8-inch in 10 feet, and the upstanding leg shall not vary more than 1/4-inch. The forms shall contain provisions for locking the ends of abutting form sections together tightly, and for secure setting.

501.03.3 Preparation of Grade. After the roadbed has been graded and compacted to meet the density requirements of **Subsection 301.03.2** of these Specifications, the grade shall be trimmed approximately to correct elevation, extending the work at least 2 feet beyond each edge of the proposed concrete pavement or base.

501.03.4 Setting Support.

a. Base Support. The foundation under the forms shall be hard and true to grade so that the form, when set, will be firmly in contact for its whole length and at the specified grade.

b. Form Setting. Forms shall be set sufficiently in advance of the point where concrete is being placed. Forms shall be staked into place with not less than 3 pins for each 10-foot section. A pin shall be placed at each side of every joint. Form sections shall be tightly interlocked, free from play or movement in any direction. The forms shall not deviate from true line by more than 1/4-inch at any point. No excessive settlement or springing of forms under the finishing machine will be tolerated. Forms shall be cleaned and oiled prior to the placing of concrete.

c. Grade and Alignment. The alignment and grade elevations of the forms shall be checked and corrections made by the Contractor before placing the concrete. When any form has been disturbed or any grade has become unstable, the form shall be reset and rechecked.

501.03.5 Conditioning of Subgrade or Base Course. When side forms have been securely set to grade, the subgrade or base course shall be brought to proper cross section. High areas shall be trimmed to proper elevation. Low areas may be filled and compacted to a condition similar to that of surrounding grade, or filled with concrete integral with the pavement. The finished grade shall be maintained in a smooth and compacted condition until the pavement is placed.

Unless waterproof subgrade or base course cover material is specified, the subgrade or base course shall be uniformly moist when the concrete is placed. If it subsequently becomes too dry, the subgrade or base course shall be sprinkled, but the method of sprinkling shall not be such as to form mud or pools of water.

501.03.6 Placing Concrete. Concrete shall not be placed on soft, muddy, or frozen subgrade or subbase. Also, concrete shall not be placed when subgrade is frozen under adjacent pavement which is to remain in place.

The concrete shall be deposited on the grade in such manner as to require as little rehandling as

possible. Unless truck mixers, truck agitators, or nonagitating hauling equipment are equipped with means for discharge of concrete without segregation of the materials, the concrete shall be unloaded into an approved spreading device and mechanically spread on the grade in such manner to prevent segregation of the materials. Placing shall be continuous between transverse joints without the use of intermediate bulkheads. Necessary hand spreading shall be done with shovels, not rakes. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substances.

Where concrete is to be placed adjoining a previously constructed lane of pavement and mechanical equipment will be operated upon the existing lane of pavement, that pavement shall meet the minimum flexural strength of 525 pounds per square inch when tested by the third-point method in accordance with AASHTO T97. If only finishing equipment is carried on the existing lane, paving in adjoining lanes may be permitted after three days.

Concrete shall be thoroughly consolidated against and along the faces of all forms and along the full length and on both sides of all joint assemblies, by means of internal vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, reinforcement, or a side form. In no case shall the vibrator be operated longer than 10 seconds in any one location. The vibration shall be of sufficient duration to thoroughly consolidate the concrete but not so long as to produce segregation.

Concrete shall be deposited as near to expansion and contraction joints as possible without disturbing them, but shall not be dumped from the discharge bucket or hopper onto a joint assembly unless the hopper is well centered on the joint assembly.

Should any concrete materials fall on or be worked into the surface of a completed slab, they shall be removed immediately by approved methods.

501.03.7 Test Specimens. The Contractor shall furnish the concrete necessary for casting test beams and cylinders. The beams shall be cured by a designated method as specified for the pavement according to AASHTO T23.

501.03.8 Strike-off of Concrete and Placement of Reinforcement. Following the placing of the concrete, it shall be struck off to conform to the cross section shown on the Plans and to an elevation such that when the concrete is properly consolidated and finished, the surface of the pavement will be at the elevation shown on the Plans. When reinforced concrete pavement is placed in two layers, the entire width of the bottom layer shall be struck off to such length and depth that the sheet of fabric or bar mat may be laid full length on the concrete in its final position without further manipulation. The reinforcement shall then be placed directly upon the concrete, after which the top layer of the concrete shall be placed, struck off and screeded. Any portion of the bottom layer of concrete which has been placed more than 30 minutes without being covered with the top layer shall be removed and replaced with freshly mixed concrete at the Contractor's expense. When reinforced concrete is placed in one layer, the reinforcement may be positioned in advance of concrete placement or it may be placed in plastic concrete, after spreading by mechanical or vibratory means. The surface of reinforcing steel shall be free from any material which could impair bond of the steel with the concrete, all in accordance with the applicable requirements of **SECTION 808; CAST-IN-PLACE STRUCTURE CONCRETE MASONRY**, of these Specifications.

501.03.9 Joints. Joints shall be constructed of the type and dimensions, and at the locations required by the Plans or Special Provisions.

a. Longitudinal Joint. Longitudinal sawed joints shall be cut by means of approved concrete saws to the depth, width and line shown on the Plans. Suitable guide lines or devices shall be used to assure cutting the longitudinal joint on the true line as shown on the Plans. The longitudinal joint shall be sawed before the end of the curing period and before any equipment or vehicles are allowed on the pavement. The sawed area shall be thoroughly cleaned and, if required, the joint shall immediately be filled with sealer.

b. Transverse Expansion Joints. The expansion joint filler shall be continuous from form to form, shaped to the subgrade and to the keyway along the form. Preformed joint filler shall be furnished in lengths equal to the pavement width or equal to the width of one lane. Damaged or repaired joint filler shall not be used unless approved by the Engineer.

The expansion joint filler shall be held in a vertical position. An approved installing bar, or other device, shall be used if required to secure preformed expansion joint filler at the proper grade and alignment during placing and finishing of the concrete. Finished joints shall not deviate more than 1/4-inch in the horizontal alignment from a straight line. If joint fillers are assembled in sections, there shall be no offsets between adjacent units. No plugs of concrete shall be permitted anywhere within the expansion space.

c. Transverse Contraction Joints. Transverse contraction joints shall consist of planes of weakness created by cutting grooves in the surface of the pavement and, when shown on the Plans, shall include load transfer assemblies.

1. Sawed Contraction Joints shall be created by sawing grooves in the surfaces of the pavement or base to the dimensions and at the spacing and lines shown on the Plans with an approved concrete saw. After each joint is sawed, the saw cut and adjacent concrete surface shall be thoroughly cleaned.

If curing blankets are used they shall be removed from the pavement only at the location(s) where a joint is to be sawed and only a sufficient width to allow the cut to be made. As soon as the cut has been made curing material shall be replaced. In no case shall either the top or edges of concrete be left unprotected for more than one-half hour.

Sawing of the joints shall commence as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling, usually 4 to 24 hours. All joints shall be sawed before uncontrolled shrinkage cracking takes place. If necessary, the sawing operations shall be carried on during the day and night, regardless of weather conditions. The sawing of any joint shall be omitted if a crack occurs at or near the joint location prior to the time of sawing. Sawing shall be discontinued when a crack develops ahead of the saw. The pavement within the lane where cracks occur shall be removed to the full width of the lane and replaced. The minimum lane length of pavement replacement shall be 6 feet. If cracking occurs on both sides of the same joint, the dowel assembly and a minimum of 3 feet on each side of the joint shall be removed and replaced, all at the Contractor's expense.

In general, all joints should be sawed in sequence. All contraction joints in lanes adjacent to previously constructed lanes shall be sawed before uncontrolled cracking occurs. If extreme condi-tions exist which make it impractical to prevent erratic cracking by early sawing, the contraction joint groove shall be formed prior to initial set of concrete.

2. Transverse Construction Joints shall be constructed when there is an interruption of more than 30 minutes in the concreting operations. No transverse joint shall be constructed within 10 feet of an expansion joint, contraction joint, or plane of weakness. If sufficient concrete has not been mixed at the time

of interruption to form a slab at least 10 feet long, the excess concrete back to the last preceding joint shall be removed and disposed of.

3. Load Transfer Devices. Dowels, when used, shall be held in position parallel to the surface and centerline of the slab by a metal device that is left in the pavement.

The dowels shall be thoroughly coated with an approved lubricant to prevent the concrete from binding to that portion of the dowel. An approved metal dowel cap or sleeve shall be furnished for each dowel bar used with the expansion joints. The caps or sleeves shall fit the dowel bar tightly and the closed end shall be watertight.

In lieu of using dowel assemblies at contraction joints, dowel bars may be placed in the full thickness of pavement by a mechanical device approved by the Engineer.

501.03.10 Final Strike-off, Consolidation and Finishing of Concrete Pavement.

a. Sequence. The sequence of operations shall be the strike-off and consolidation; machine finishing; floating; straightedging; and texturing.

Following the placement of concrete, it shall be struck off to conform to the cross section indicated on the Plans and to an elevation such that once the concrete is properly consolidated and finished, the surface of the pavement will be at the elevation indicated on the Plans.

In general, the addition of surficial water to the surface of the concrete to assist in finishing operations will not be permitted. If the application of water to the surface is permitted, it shall be applied as a fog spray by means of approved spray equipment.

b. Finishing at Joints. The concrete adjacent to joints shall be compacted or firmly placed without voids or segregation against the joint material, also under and around all load transfer devices, joint assembly units, and other features designed to extend into the pavement. Concrete adjacent to joints shall be mechanically vibrated as required in **Subsection 501.03.6**.

After the concrete has been placed and vibrated adjacent to the joints as required in **Subsection 501.03.6**, the finishing machine shall be brought forward, operating in a manner to avoid damage or misalignment of joints. If uninterrupted operation of the finishing machine, to, over, and beyond the joints causes segregation of concrete, damage to, or misalignment of the joints, the finishing machine shall be stopped when the front screed is approximately 8 inches from the joint. Segregated concrete shall be removed from in front of and off the joint; the front screed shall be lifted and set directly on top of the joint and the forward motion of the finishing machine resumed. When the second screed is close enough to permit the excess mortar in front of it to flow over the joint, it shall be lifted and carried over the joint. Thereafter, the finishing machine may be run over the joint without lifting the screeds, provided there is no segregated concrete immediately between the joint and the screed or on top of the joint.

c. Machine Finishing.

1. Nonvibratory Method. The concrete shall be distributed or spread as soon as placed. As soon as the concrete has been placed, it shall be struck off and screeded by an approved finishing machine. The machine shall go over each area of pavement as many times and at such intervals as necessary to give the proper compaction and to leave a surface of uniform texture. Excessive operation over a given area shall be avoided. The tops of the forms shall be kept clean by an effective device attached to the machine and the

travel of the machine on the forms shall be maintained true without lift, wobbling, or other variation tending to affect the precision finish.

During the first pass of the finishing machine, a uniform ridge of concrete shall be maintained ahead of the front screed for its entire length.

2. Vibratory Method. When vibration is specified, vibrators for full width vibration of concrete paving slabs shall meet the requirements in **Subsection 501.03.2, Para. b**. If uniform and satisfactory density of the concrete is not obtained by the vibratory method at joints, along forms, at structures, and throughout the pavement, the Contractor will be required to furnish equipment and methods which will produce pavement conforming to the Specifications. All the provisions in **Para. c.1,** above, not in conflict with the provisions for the vibratory method shall govern.

d. Hand Finishing. Unless otherwise specified, hand finishing methods will not be permitted except under the following conditions:

In the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade when the breakdown occurs.

Narrow widths or areas of irregular dimensions where operations of the mechanical equipment is impractical may be finished by hand methods.

Concrete, as soon as placed, shall be struck off and screeded. An approved portable screed shall be used. A second screed shall be provided for striking off the bottom layer of concrete, if reinforcement is used.

The screed for the surface shall be at least 2 feet longer than the maximum width of the slab to be struck off. It shall be of approved design, sufficiently rigid to retain its shape, and be constructed either of metal or of other suitable material shod with metal.

Consolidation shall be attained by the use of a suitable vibrator or other approved equipment. If necessary, this shall be repeated until the surface is of uniform texture, true to grade and cross section, and free from porous areas.

e. Floating. After the concrete has been struck off and consolidated, it shall be further smoothed, trued, and consolidated by means of a longitudinal float, using one of the following methods as specified or permitted:

1. Hand Method. The hand-operated longitudinal float shall be not less than 12 feet in length and 6 inches in width, properly stiffened to prevent flexibility and warping. The longitudinal float, operated from foot bridges resting on the side forms and spanning but not touching the concrete, shall be worked with a sawing motion, while held in a floating position parallel to the road centerline, and passing gradually from one side of the pavement to the other. Movement ahead along the centerline of the pavement shall be in successive advances of not more than one-half the length of the float. Any excess water or soupy material shall be wasted over the side forms on each pass.

2. Mechanical Method. The mechanical longitudinal float shall be of a design approved by the Engineer, and shall be in good working condition. The tracks from which the float operates shall be accurately adjusted to the required crown. The float shall be accurately adjusted and coordinated with the adjustments

of the transverse finishing machine so that a small amount of mortar is carried ahead of the float at all times. The forward speed shall be adjusted so that the float will lap the distance specified by the Engineer on each transverse trip. The float shall pass over each area of pavement at least two times, but excessive operation over a given area will not be permitted. Any excess water or soupy material shall be wasted over the side forms on each pass.

3. Alternative Mechanical Method. As an alternative to the Mechanical Method described above, the Contractor may use a machine composed of a cutting and smoothing float, or floats, suspended from and guided by a rigid frame. The frame shall be carried by four or more visible wheels riding on, and constantly in contact with, the side forms.

If necessary, following one of the preceding methods of floating, long-handled floats having blades not less than 5 feet in length and 6 inches in width may be used to smooth and fill in open textured areas in the pavement. Long-handled floats shall not be used to float the entire surface of the pavement in lieu of, or supplementing, one of the preceding methods of floating. When strike- off and consolidation are done by the hand methods and the crown of the pavement will not permit the use of the longitudinal float, the surface shall be floated transversely by means of the long- handled float. Care shall be taken not to work the crown out of the pavement during the operation. After floating, any excess water and laitance shall be removed from the surface of the pavement by a straightedge 10 feet or more in length. Successive drags shall be lapped one-half the length of the blade.

f. Straightedge Testing and Surface Correction. After the floating has been completed and the excess water removed, but while the concrete is still plastic, the surface of the concrete shall be tested for trueness with a 10-foot straightedge. For this purpose, the Contractor shall furnish and use an accurate 10-foot straightedge swung from handles 3 feet longer than one-half the width of the slab. The straightedge shall be held in contact with the surface in successive positions parallel and perpendicular to the road centerline and the whole area gone over from one side of the slab to the other as necessary. Advance along the road shall be in successive stages of not more than one-half the length of the straightedge. Any depressions found shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the requirements for smoothness. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge and the slab conforms to the required grade and cross section.

g. Final Finish. The final finish shall be specified or shown on the Plans and shall consist of one of the three finishes described as follows:

1. Broom Finish. If the surface texture is to be a broom finish, it shall be applied when the water sheen has practically disappeared. The broom shall be drawn from the center to the edge of the pavement with adjacent strokes slightly overlapping. The brooming operation shall be so executed that the corrugations produced in the surface shall be uniform in appearance and not more that 1/8-inch in depth. Brooming shall be completed before the concrete is in such condition that the surface will be torn or unduly roughened by the operation. The surface thus finished shall be free from rough and porous areas, irregularities, and depressions, resulting from improper handling of the broom. Brooms shall be of the quality, size, and construction and be so operated as to produce a surface finish meeting the approval of the Engineer. Subject to satisfactory results being obtained and approval of the Engineer, the Contractor will be permitted to substitute mechanical brooming in lieu of the manual brooming as herein described.

2. Belt Finish. If the surface texture is to be a belt finish, when straightedging is complete and water sheen has practically disappeared and just before the concrete becomes nonplastic, the surface shall be belted with a 2-ply canvas belt not less than 8-inches wide and at least 3 feet longer than the pavement width. Hand belts shall have suitable handles to permit controlled, uniform manipulation. The belt shall be operated with short strokes transverse to the road centerline and with a rapid advance parallel to the centerline.

3. Drag Finish. If the surface texture is to be a drag finish, a drag shall be used which shall consist of a seamless strip of damp burlap or cotton fabric, which shall produce a uniform surface of gritty texture after dragging it longitudinally along the full width of pavement. For pavement 16 feet or more in width, the drag shall be mounted on a bridge which travels on the forms. The dimensions of the drag shall be such that a strip of burlap or fabric at least 3 feet wide is in contact with the full width of pavement surface while the drag is used. The drag shall consist of not less than 2 layers of burlap with the bottom layer approximately 6 inches wider than the upper layer. The drag shall be maintained in such condition that the resultant surface is of uniform appearance and reasonably free from grooves over 1/8-inch in depth. Drags shall be maintained clean and free from encrusted mortar. Drags that cannot be cleaned shall be discarded and new drags substituted.

h. Edging at Forms and Joints. After the final finish, but before the concrete has taken its initial set, the edges of the pavement along each side of each slab, and on each side of transverse expansion joints, formed joints, transverse construction joints, and emergency construction joints, shall be worked with an approved tool and rounded to the radius required by the Plans. A well- defined and continuous radius shall be produced and a smooth, dense mortar finish obtained. The surface of the slab shall not be unduly disturbed by tilting of the tool during use.

At all joints, any tool marks appearing on the slab adjacent to the joints shall be eliminated by brooming the surface. In doing this, the rounding of the corner of the slab shall not be disturbed. All concrete on top of the joint filler shall be completely removed.

All joints shall be tested with a straightedge before the concrete has set, and corrections made if one side of the joint is higher than the other or if they are higher or lower than the adjacent slabs.

i. Concrete Base. In the case of concrete base, the above requirements for finishing and/or longitudinal floating are waived.

501.03.11 Surface Test.

a. Concrete Pavement. As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with an approved 10-foot straightedge furnished by the Contractor. Areas showing high spots of more than 1/4-inch but not exceeding 1/2-inch in ten feet shall be marked and immediately ground down with an approved grinding tool to an elevation where the area or spot will not show surface deviations in excess of 1/4-inch when tested with a 10-foot straightedge. Where the departure from correct cross section exceeds ½-inch, the pavement shall be removed and replaced by and at the expense of the Contractor.

Any area or section so removed shall be not less than 10 feet in length nor less than the full width of the lane involved. When it is necessary to remove and replace a section of pavement, any remaining portion of the slab adjacent to the joints that is less than 10 feet in length, shall also be removed and replaced.

b. Concrete Base. The surface of the concrete base shall be roughened by any means acceptable to the Engineer such as brooming, tinning, or burlap drag. The surface shall be finished so that there will be no deviation of more than 3/8-inch between any two contact points when tested with a 10-foot straightedge.

501.03.12 Curing. Immediately after the finishing operations have been completed and as soon as marring of the concrete will not occur, the entire surface of the newly placed concrete shall be cured in accordance with the applicable provisions of **Subsection 601.03.8** of these Specifications.

501.03.13 Removing Forms. Unless otherwise provided, forms shall not be removed from freshly placed concrete until it has set for at least 12 hours, except auxiliary forms used temporarily in widened areas. Forms shall be removed carefully so as to avoid damage to the pavement. After the forms have been removed, the sides of the slab shall be cured as outlined in one of the methods indicated above. Major honeycombed areas will be considered as defective work and shall be removed and replaced. Any area or section so removed shall not be less than 10 feet in length nor less than full width of the lane involved. When it is necessary to remove and replace a section of pavement, any remaining portion of the slab adjacent to the joints that is less than 10 feet in length, shall also be removed and replaced.

501.03.14 Sealing Joints. If the joints are to be sealed, they shall be filled with joint sealing material before the pavement is opened to traffic, and as soon after completion of the curing period as is feasible. Just prior to sealing, each joint shall be thoroughly cleaned of all foreign material, including membrane curing compound and the joint faces shall be cleaned and surface dry when the seal is applied. Material for seal applied hot shall be stirred during heating so that localized overheating does not occur.

The sealing material shall be applied to each joint opening to conform to the details shown on the Plans or as directed by the Engineer. The pouring shall be done in such a manner that the material will not be spilled on the exposed surfaces of the concrete. Any excess material on the surface of the concrete pavement shall be removed immediately and the pavement surface cleaned. The use of sand or similar material as a cover for the seal will not be permitted. Poured joint-sealing material shall not be placed when the air temperature in the shade is less than 50°F, unless approved by the Engineer.

When specified, preformed compression seals and lubricant adhesive shall conform to **Subsection M.02.10.3** of these Specifications.

501.03.15 Protection of Pavement. The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by his own employees and agents. Any damage to the pavement, occurring prior to final acceptance, shall be repaired or the pavement replaced.

501.03.16 Opening to Traffic. The Engineer will decide when the pavement or base shall be opened to traffic. Pavement or base will not be opened to traffic until specimen beams have attained a flexural strength of 525 pounds per square inch when tested by the third-point method, in accordance with AASHTO T97.

501.03.17 Concrete Pavement-Slip Form Method. If the Contractor elects to use the slip-form method, the following provisions shall apply:

a. Grade. After the grade or base has been placed and compacted to the required density, the areas which will support the paving machine shall be cut to the proper elevation by means of a properly designed machine. The grade on which the pavement is to be constructed shall then be brought to the proper profile by means of a properly designed machine. If the density of the base is disturbed by the grading operations, it shall be corrected by additional compaction before concrete is placed. The grade should be constructed sufficiently in advance of the placing of the concrete. If any traffic is allowed to use the prepared grade, the grade shall be checked and corrected immediately ahead of the placing of the concrete.

b. Placing Concrete. The concrete shall be placed with an approved slip-form paver designed to spread, consolidate, screed, and float-finish the freshly placed concrete in such manner that a minimum of hand finish will be necessary to provide a dense and homogenous pavement in conformance with the Plans and Specifications. The machine shall vibrate the concrete for the full width and depth of the strip of pavement being placed. Such vibration shall be accomplished with vibrating tubes or arms working in the concrete. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms. The forms shall trail behind the paver for such a distance that no appreciable slumping of the concrete will occur, and that necessary final finishing can be accomplished while the concrete is still within the forms.

The concrete shall be held at a uniform consistency, having a slump of not more than 2 inches. The slip-form paver shall be operated with as nearly a continuous forward movement as possible and all operations of mixing, delivering and spreading concrete shall be so coordinated as to provide uniform progress with stopping and starting of the paver held to a minimum. If, for any reason, it is necessary to stop the forward movement of the paver, the vibratory and tamping elements shall also be stopped immediately. No tractive force shall be applied to the machine, except that which is controlled from the machine.

c. Finishing. The surface smoothness and texture shall meet the requirements of **Subsection 501.03.10** and **Subsection 501.03.11**.

d. Curing. Unless otherwise specified, curing shall be done in accordance with one of the methods included in **Subsection 601.03.8**. The curing media shall be applied at the appropriate time and shall be applied uniformly and completely to all surfaces and edges of the pavement.

e. Joints. All joints shall be constructed in accordance with **Subsection 501.03.9** and sealed in accordance with **Subsection 501.03.14**.

f. Protection Against Rain. In order that the concrete may be properly protected against the effects of rain before the concrete is sufficiently hardened, the Contractor will be required to have available at all times materials for the protection of the edges and surface of the unhardened concrete. Such protective materials shall consist of standard metal forms or wood plank having a nominal thickness of not less than 2 inches and a nominal width of not less than the thickness of the pavement at its edge for the protection of the pavement edges, and covering material such as burlap or cotton mats, curing paper, or plastic sheeting material for the protection of the surface of the pavement. When rain appears imminent, all paving operations shall stop and all available personnel shall begin placing forms against the sides of the pavement and covering the surface of the unhardened concrete with the protective covering.

501.03.18 Tolerance in Pavement or Base Thickness. The thickness of the pavement or base will be determined by the average caliper measurement of cores tested in accordance with AASHTO T148.

For the purpose of establishing an adjusted unit price for the pavement or base, units to be considered separately are defined as 1,000 linear feet of pavement in each traffic lane starting at the end of the pavement bearing the smaller station number. The last unit in each lane shall be 1,000 feet plus the fractional part of 1,000 feet remaining. One core will be taken at random by the Department in each unit. When the measurement of the core from a unit is not deficient more than 3/8-inch from the Plan thickness, full payment will be made. When such measurement is deficient more than 3/8-inch and not more than 1 inch from the Plan thickness two additional cores at intervals of not less than 300 feet will be taken and used in the average thickness for that unit. An adjusted unit price as provided in **Subsection 501.05.2** will be paid for the unit represented.

Other areas such as intersections, entrances, crossovers, ramps, etc., will be considered as one unit and the thickness of each unit will be determined separately. Small irregular unit areas may be included as part of another unit. At such points as the Engineer may select in each unit, one core will be taken for each 1,000 square yards of base or pavement, or fraction thereof, in the unit. If the core so taken is not deficient more than 3/8-inch from the Plan thickness, full payment will be made. If the core is deficient in thickness by more than 3/8-inch but not more than 1 inch from the Plan thickness, two additional cores will be taken from the area represented and the average of the three cores determined. If the average measurement of these three cores is not deficient more than 3/8-inch from the Plan thickness, full payment will be made. If the average thickness of the three cores is deficient more than 3/8-inch but not more than 1 inch from the Plan thickness, an adjusted unit price as provided in **Subsection 501.05.2** will be paid for the area represented by these cores.

In calculating the average thickness of the base, measurements which are in excess of the specified thickness by more than 3/8-inch will be considered as the specified thickness plus 3/8- inch, and measurements which are less than the specified thickness by more than 1 inch will not be included in the average.

When the measurement of any core is less than the Plan thickness by more than 1 inch, the actual thickness of the base in this area will be determined by taking additional cores at 10-foot intervals parallel to the centerline in each direction from the affected location until in each direction a core is found which is not deficient by more than 1 inch. Areas found deficient in thickness by more than 1 inch shall be evaluated by the Engineer. If the Engineer decides that the deficient areas should be removed, they shall be removed and replaced with concrete of the thickness shown on the Plans. Exploratory cores for deficient thickness will not be used in averages for adjusted unit price.

The method of establishing the adjusted unit price for pavement based on the measurement of cores is specified below in **Subsection 501.05.2**.

END OF SECTION

SECTION 33 05 61

DOT 702

MANHOLES

702.01 DESCRIPTION. This work consists of the construction, of manholes, inlets, and catch basins in reasonably close conformity with the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

702.02 MATERIALS.

702.02.1 Masonry Unit Construction.

a. General. Clay Brick, Concrete Masonry Units, Lime, Mortar, Frames, Grates, Covers, and Ladder Rungs shall conform to the applicable requirements of **Subsection M.04.03** of these Specifications.

b. Gravel Borrow. Gravel Borrow shall conform to the requirements of **Subsection M.01.02** of these Specifications.

c. Concrete. Concrete for these structures shall conform to the applicable requirements of **SECTION 601; PORTLAND CEMENT CONCRETE,** of these Specifications.

d. Reinforcing. Reinforcing bars shall conform to the requirements of **Subsection M.05.01; Bar Reinforcement**, of these Specifications.

Wire Fabric reinforcing shall conform to the applicable requirements of **Subsection M.05.02.1; Wire Fabric**, of these Specifications.

e. Inspection of Materials. All materials used in the construction of drainage structures shall be subject to acceptance testing by the Engineer. The Contractor shall provide sufficient time for the Engineer to test and inspect said materials prior to their respective incorporation into the work.

702.02.2 Precast Concrete Construction.

a. General. Precast concrete drainage structures will be considered acceptable alternatives to the corresponding masonry unit structures when the latter are specified in the Contract Documents.

b. Precast Concrete Structures shall conform to the applicable requirements of **SECTIONS 601** and **809; PORTLAND CEMENT CONCRETE** and **PRECAST/PRE-STRESSED STRUCTURE CONCRETE MASONRY**, respectively, of these Specifications.

c. Precast Concrete Catch Basins and Manholes shall be designed and manufactured in accordance with ASTM C478; "Precast Concrete Manhole Sections," with the additional stipulation that the concrete mix design shall be Class XX as set forth in **SECTION 601** of these Specifications.

d. Other Materials. Materials and the inspection of said materials as specified under **Subsection 702.02.1; Paras. a, b, d, and e** of this Section shall apply equally to precast concrete drainage structures.

702.03 CONSTRUCTION METHODS.

702.03.1 Masonry Unit Construction.

a. Location. Drainage structures shall be constructed at the locations indicated on the Plans. If obstructions are encountered at these locations that cannot be conveniently removed, the Engineer will direct that said structures be constructed at either slightly revised or alternate locations.

b. Excavation. Excavation for drainage structures shall be performed in accordance with the applicable requirements of **SECTION 203; STRUCTURE EXCAVATION AND BACKFILL**, of these Specifications. Excavation shall be made to the required horizontal cross section, as directed by the Engineer, and shall be carried to a sufficient depth to accommodate the concrete bases and/or bedding of the various drainage structures. The bottom of the excavation shall be graded and thoroughly tamped prior to placement of concrete bases.

c. Replacement of Unsuitable Material. When the Engineer determines that the material at the bottom of excavations is unsuitable for the support of drainage structures, additional excavation to remove said material shall be ordered. When the unsuitable material has been removed, the bottom of the excavation shall be hand compacted and refilled with appropriate material as approved by the Engineer.

d. Concrete Bases. Plain concrete bases of certain drainage structures shall be constructed in accordance with the applicable requirements of **Subsection 808.03.2; Footings,** of these Specifications.

e. Restrictions on Certain Masonry Units. Concrete brick will not be allowed as a construction material for drainage structures. Concrete masonry block will only be allowed for the vertical riser portions of structures and will not be allowed in the corbeling portions. Clay brick shall be used for corbeling up to the bottom of metal frames.

f. Precast Concrete Sump. If called for on the Plans for use in wet areas, a precast concrete sump section shall be utilized for standard 4-foot round catch basins.

g. Backfill. After construction of drainage structures has proceeded to their respective full heights, the excavation shall be backfilled and compacted in accordance with **Subsection 203.03.5; Para. c, Common Backfill,** of these Specifications.

h. Unauthorized Excavation. If the bottom of any drainage structure excavation has been carried below the grade indicated on the Plans, or as directed by the Engineer, it shall be brought back to grade by filling with appropriate material as approved by the Engineer.

i. Final Cleanup. Upon completion of construction, each drainage structure shall be cleaned of any accumulation of silt, earth, debris, or foreign matter of whatever kind, and shall be maintained in such condition until final acceptance of the work. Catch basins, manholes and inlets requiring subsequent cleaning through no fault of the Contractor after the obligatory cleaning will be paid for in accordance with **SECTION 708; CLEANING AND FLUSHING PIPES AND DRAINAGESTRUCTURES**, of these

Specifications.

702.03.2 Precast Concrete Construction.

a. Testing and Inspection. Precast concrete drainage structure units shall be inspected both at the point of manufacture and at the project site. Any such units exhibiting defects or damage that cannot be corrected to the complete satisfaction of the Engineer shall be removed and replaced by the Contractor at no additional cost to the State.

b. Other Construction Requirements. Construction methods specified under **Subsection 702.03.1; Paras. a, b, c, d, g, h, and i** of this Section shall apply equally to precast concrete drainage structures.

END OF SECTION

SECTION 32 90 00

DOT L

PLANTING

SECTION L.01

LOAM, PLANTABLE SOIL OR HIGH ORGANIC SOIL

L.01.01 DESCRIPTION.

L.01.01.1 Loam. This work consists of placing loam to the lines, grades, and depths shown on the Plans or as directed by the Engineer, all in accordance with these Specifications. The loam shall be furnished by the Contractor from sources outside the project limits (Loam Furnished and Spread).

L.01.01.2 Plantable Soil. This work consists of furnishing and placing plantable soil to a 4-inch depth on designated areas in close conformity to the lines and grades as shown on the Plans or as directed by the Engineer. Plantable soil shall be either furnished by the Contractor from sources outside the project limits, "Plantable Soil Furnished and Spread," or material removed and stockpiled by the Contractor under the excavation items, "Plantable Soil Rehandled and Spread."

L.01.01.3 High Organic Soil. This work consists of furnishing and placing high organic soil to the lines, grades, and depths in detention ponds, wetland replacement and/or wetlands restoration/reclamation areas, as specified herein, as shown on the Plans or as directed by the Engineer. High organic soil shall be either furnished by the Contractor from sources outside the project limits, "High Organic Soil Furnished and Spread," or material removed and stockpiled by the Contractor under the excavation items, "High Organic Soil Rehandled and Spread."

L.01.02 MATERIALS. Loam, Plantable Soil and High Organic Soil shall be clean and free of any undesirable material and conform to the applicable requirements of **SECTION M.18; LANDSCAPING MATERIALS.**

L.01.03 CONSTRUCTION METHODS.

L.01.03.1 Loam. The Contractor shall submit a sample for testing prior to the placement of loam. The sample will be taken from material furnished by the Contractor or from the removed and stockpiled material on site. The sample shall be approved by the Engineer prior to the placement. Loam which does not meet the requirements specified in **SECTION M.18; LANDSCAPING MATERIALS,** shall be rejected.

Prior to the placement of loam, the Contractor shall prepare the surface to receive the loam. All roots, sod, weeds, cobbles or stone with any dimension greater than 1 inch shall be removed and legally disposed of.

Loam shall be placed on surfaces which are true to the lines, grades, and cross-sections shown on the Plans or established by the Engineer. Loam shall be placed and spread to the required depth; the minimum thickness shall be as indicated on the Plans and/or in the Proposal.

The loamed surface shall be graded, and all roots, sods, weeds, cobbles or stones with any dimension greater than 1 inch shall be removed and legally disposed of. After shaping and grading, all trucks and other equipment not required to perform seeding, mulching or mowing operations shall be excluded from the loamed areas.

Work under this item shall be performed only with the permission of the Engineer. The Engineer may suspend work when he determines soil or weather conditions are unsuitable for spreading and/or grading loam. The Contractor may resume work when directed by the Engineer.

All loamed areas shall be seeded no more than two weeks after spreading the loam. Refer to **SECTION L.02; SEEDING,** for dates and other requirements. Loamed areas shall be maintained, free from erosion until acceptance of the project.

L.01.03.2 Plantable Soil. The Contractor shall place plantable soil in accordance with **Subsection L.01.03.1**, above.

When items for both "Plantable Soil Rehandled and Spread" and "Plantable Soil Furnished and Spread" appear in the Contract, the Contractor shall complete the placing of all plantable soil available on the project before proceeding to obtain plantable soil from outside sources to the extent feasible in the construction sequence.

L.01.03.3 High Organic Soil. The Contractor shall submit a sample for testing prior to the placement of High Organic Soil. The sample shall be approved by the Engineer prior to placement. High Organic Soil which does not meet the requirements specified in **SECTION M.18; LANDSCAPING MATERIALS,** shall be rejected.

High Organic Soil shall be placed on surfaces which are true to the lines, grades, and cross sections shown on the Plans or established by the Engineer. The depth and location of High Organic Soil shall be as shown on the Plans. All slopes shall be tracked with a dozer. The resulting tracks shall be perpendicular to the flow of water. All roots, sods, weeds, cobbles or stones with any dimension greater than 4 inches shall be removed from the soil surface and legally disposed of. No raking will be permitted.

When items for both "High Organic Soil Rehandled and Spread" and "High Organic Soil Furnished and Spread" appear in the Contract, the Contractor shall complete the placing of all high organic soil available on the project before proceeding to obtain high organic soil from outside sources to the extent feasible in the construction sequence.

The Contractor shall apply a wetland seed mix immediately after spreading and tracking the High Organic Soil. Refer to **SECTION L.02; SEEDING,** for dates and other requirements.

SECTION L.02

SEEDING

L.02.01 DESCRIPTION. This work consists of the preparation of the seed bed, furnishing and placing materials, and the establishing of grassed areas as shown on the Plans, in accordance with these Specifications or as directed by the Engineer. Work shall consist of the following six types:

Type 1. Plantable Soil areas, either flats, to be seeded with a Park Seed Mix or slopes, to be seeded with a Slope Seed Mix;

Type 2. Loamed areas adjacent to lawns or sidewalks, seeded with a Residential Seed Mix;

Type 3. Temporary seeding using a Temporary Seed Mix on sloped and flat areas of embankments or excavation sites, to provide temporary vegetative cover for erodible soils;

Type 4. Plantable Soil areas, either flats or slopes, seeded with a Native Seed Mix; Type 5.

Wetland Areas and High Organic Soil, seeded with a Wetland Seed Mix;

Type 6. Plantable Soil areas, either flats or slopes seeded with a Wildflower Seed Mix. Slope areas

shall be defined as being 3:1 or greater.

L.02.02 MATERIALS. Lime, fertilizer, mulch, water and seed mixtures shall conform to the applicable requirements of **SECTION M.18; LANDSCAPING MATERIALS**.

L.02.03 CONSTRUCTION METHODS.

L.02.03.1 Seeding Dates. Full advantage shall be taken of time and weather conditions best suited for seeding. The normal dates for seeding shall be as follows:

Type 1, Type 2, and Type 4 dates shall be: Spring

Seeding:	April 1 to May 31.
Fall Seeding:	August 15 to October 15.

Type 3 seeding may be done at anytime between March 15 and November 15 with approval of the Engineer. Type 3 seeding shall not be permitted on frozen ground.

Type 5 seeding dates shall be as follows: Spring

Seeding:	May 1 to June 15
Fall Seeding:	August 15 to September 30

Type 6 seeding dates shall be as follows:

Spring Seeding:	April 1 to May 1
Fall Seeding:	September 1 to September 30

Seeding at other than the above time will be allowed only with the written permission of the Engineer. The Engineer may suspend work when he/she determines that soil or weather conditions are unsuitable for raking and/or seeding. The Contractor may resume work when directed by the Engineer.

The Contractor shall notify the Engineer at least 48 hours in advance of the time intended for commencement of seeding. No payment will be made for work performed when the Engineer is not present. In cases where there is existing or new plant material, care shall be taken to ensure that no lime, fertilizer, mulch and/or seed mix comes in contact with the plant material or their mulched areas.

L.02.03.2 Preparation of Areas for Seeding.

a. Type 1 (General Highway Seeding). Type 1 areas shall be raked, either by hand or mechanically (i.e. power rake), so as to produce a loose, friable seed bed. Slopes 3:1 and greater shall be tracked with a dozer. The resulting track imprints shall be perpendicular to the flow of water.

All sticks, litter, wire, weeds, cable, cobbles or stones larger than 1 inch in any dimension shall be removed and legally disposed of.

Where the seed bed has become compacted, it shall be scarified to a depth of 5 inches prior to raking. No seeding of this type will be permitted on areas where the seed bed has not been properly prepared or where the soil is compacted.

b. Type 2 (Residential Seeding). Type 2 areas shall be hand raked to a finished grade. All sticks, litter, wire, weeds, cable, cobbles and stones larger than ½-inch in any dimension shall be removed and legally disposed of. After hand raking, and at the discretion of the Engineer, the Contractor shall roll, with a hand roller, the entire area. The finish grade of the proposed area shall blend into the adjacent lawns (when applicable).

Where the seed bed has become compacted, it shall be scarified to a depth of 5 inches prior to fine raking. No seeding of this type will be permitted on areas where the seed bed has not been properly prepared or where the soil is compacted.

c. Type 3 (Temporary Seeding). Type 3 areas to be seeded shall be free of depressions and unprotected channels where runoff may cause erosion.

d. Type 4 (Native Grass Seeding). Type 4 areas shall be prepared in accordance with **Para. a**, above.

e. Type 5 (Wetland Seeding). Type 5 areas shall not be raked. All sticks, litter, wire, weeds, cable, cobbles or stones larger than 4 inches in any dimension shall be removed and legally disposed of without disturbing the finish grade.

f. Type 6 (Wildflower Seeding). Type 6 areas shall be prepared in accordance with **Para. a**, above, except as designated below.

Type 6 areas previously seeded or having existing vegetation shall have all sod removed from the site proposed for wildflower seeding. Plantable soil, as designated on the Plans or as directed by the Engineer, shall be applied to raise the planting bed to final grade (after sod removal). Areas shall be raked to produce a loose friable soil.

L.02.03.3 Application of Lime. Lime (ground or pelletized) shall be applied dry and spread evenly over the entire surface to be seeded. Unless otherwise specified, the application rate shall be 1 ton per acre. Raking shall be completed after the fertilizer has been applied. NO LIME WILL BE APPLIED ON TYPE 3, TYPE 4, AND TYPE 5 AREAS.

L.02.03.4 Application of Fertilizer. After the application of lime, fertilizer shall be spread at the following rates:

Type 1 and 2 - Eight hundred-fifty pounds (850 lbs.) per acre. Type 3 -
Six hundred-fifty pounds (650 lbs.) per acre.
Type 4 - Five hundred pounds (500 lbs.) per acre.
Type 5 - No fertilizer shall be applied.
Type 6 - One hundred-fifty pounds (150 lbs.) per acre.

Both the lime and fertilizer shall be thoroughly incorporated into the soil by raking. Raking shall be in accordance with the applicable requirements of **Subsection L.02.03.2**, above.

L.02.03.5 Sowing of Seed. After the seed beds have been prepared as outlined in **Subsections L.02.03.2** through **L.02.03.4**, above, grass seed conforming to the respective formula specified in **Subsection M.18.10; Seed Mixtures**, shall be applied according to the specified rates. Application of fertilizer, grass seed, and cellulose fiber mulch for Type 1, Type 2, Type 3, Type 4, Type 5, and Type 6 may be accomplished in one operation by the use of a hydroseeder.

a. Type 1 (General Highway Seeding). Type 1 areas shall be seeded with Park Mix on flats and with Slope Seed Mix on slopes. Both mechanical and hydroseeding methods may be used.

b. Type 2 (Residential Seeding). Type 2 areas shall be seeded with a Residential Seed Mix. Additional hand raking and rolling with a light roller shall be employed in lieu of mulch. Such areas will not be accepted until a generally weed-free, 3-inch stand of grass is established.

c. Type 3 (Temporary Seeding). Type 3 areas shall be seeded with a Temporary Seed Mix on flats and slopes. Both mechanical and hydroseeding methods may be used.

d. Type 4 (Native Grass Seeding). Type 4 areas shall be seeded with a Native Seed Mix. Both mechanical and hydroseeding methods may be used.

e. Type 5 (Wetland Seeding). Type 5 areas shall be seeded with a Wetland Seed Mix. In areas where there is access for a hydroseeder, the Wetland Seed Mix shall be spread using this

method only. In areas where there is no access for a hydroseeder, the wetland seed mix shall be spread by a hand-held spreader.

f. Type 6 (Wildflower Seeding). Type 6 areas shall be seeded with a Wildflower Seed Mix. Seeds may be mechanically applied by overseeding the area with a slit seeder or broadcast with the use of a drop or broadcast spreader. A hydroseeder may be used. When hydroseeding method is used, the seed, fertilizer, and 10 percent of the mulch shall be used in the first application followed by the remaining 90 percent of mulch to be used in a second application.

If a slit seeder is used, seed disbursement shall be 3 inches on center and 1/4-inch deep. Two passes, the second perpendicular to the first shall be made. Small seeds shall be seeded separately from larger seed.

If a drop or broadcast seeding method is used, large seed shall be spread separately from small seeds. Each seed type (large or small) disbursement shall be applied in two passes, the second perpendicular to the first. The area shall be hand raked to provide a soil coverage of a 1/4- inch.

L.02.03.6 Mulching. All seeded areas shall be covered with a suitable mulch at the time of the application of the seed. Unless otherwise specified, cellulose fiber mulch shall be used. Cellulose fiber mulch shall conform to **Subsection M.18.07.1** of these Specifications.

Cellulose fiber mulch may be employed separately or as part of a hydroseeding operation. If cellulose fiber mulch is applied separately, it shall be applied immediately after the seeding operation.

Cellulose fiber mulch that becomes adhered to signs, sign posts, lighting standards, new or existing plant materials and/or walls shall be removed.

L.02.03.7 Care During Construction. Any areas which fail to show a uniform growth of grass for any reason whatsoever shall be reseeded until the areas are covered with a satisfactory growth of grass as approved by the Engineer.

The seed, fertilizer, etc. used in the reseeding operations shall be at the same application rates and during appropriate seeding dates as those previously specified unless otherwise directed by the Engineer.

a. Watering. The Contractor shall water all Type 1, Type 2, Type 4, and Type 6 seeded areas within 72 hours of the seeding operation. One additional watering may be required and such will be at the discretion of the Engineer.

Water shall be applied at a controlled rate and in such a manner to insure the water reaches the root zone. Watering operations shall not flood adjacent areas, erode soil or cause any damage to the seeded areas.

b. Mowing. Mowing for Type 1 seeded areas shall be accomplished in two mowings per year on areas flatter than 3:1. Mowing on Type 2 seeded areas shall be performed when the grass has obtained a height of 4 inches and shall be maintained at a 4-inch height until accepted.

Mowing will be performed for Type 1 and Type 2 only.

Each cutting shall result in a stand of evenly mowed grass, 3 inches tall immediately following the cutting. Neat trimming shall be necessary around all poles, trees, ledges, delineators, curbs, piers, abutments and other structures falling within the seeded areas; this trimming will be conducted simultaneously with the mowing during each cutting operation. All curbs shall be trimmed and exposed; all gutters will be left free of all grass clippings.

c. Failure to Perform Care During Construction. If the Engineer decides that the Care During Construction tasks as specified in the Contract have not been performed, the daily charge set forth in **Special Provision Code L.02.1000** will be deducted from monies due the Contractor as a charge for failure to comply with this Specification. The daily charge will continue each consecutive calendar day until the deficiencies have been corrected to the satisfaction of the Engineer.

SECTION L.05

SEED STABILIZERS

L.05.01 DESCRIPTION. This work consists of furnishing and placing seed stabilizers over seeded areas at locations indicated on the Plans, in accordance with these Specifications or as directed by the Engineer.

L.05.02 MATERIALS. Seed stabilizers shall consist of jute mesh, excelsior matting, erosion control blankets, adhesive mulch stabilizer, and straw mulch. Each such material shall conform to the applicable requirements of **SECTION M.18; LANDSCAPING MATERIALS.**

L.05.03 CONSTRUCTION METHODS.

L.05.03.1 Jute Mesh.

a. General. Jute mesh shall be applied immediately after seeding. The mesh shall be installed loosely but smoothly to fit the contour of the finished grade, parallel to and in the same direction as the surface flow of storm water.

b. Anchor Slots and Junction Slots. The up-slope end of each separate strip or piece of jute mesh shall be buried in a 6-inch minimum vertical anchor slot or junction slot with the soil tamped firmly against the mesh. The Engineer may require that any edge likely to be exposed to greater than normal flow be buried in a similar manner.

c. Check Slots. Check slots shall be spaced so that at least one such slot or junction slot or anchor slot of the jute mesh occurs in each 75 feet on gradients of less than 4 percent, and in each 50 feet on gradients of more than 4 percent. On slope drains, a check slot or an end shall occur every 25 feet.

Check slots shall be formed by folding 1 foot of the jute into a 6-inch vertical slot at right angles to the flow of water. Jute is to be stapled into place, and the surrounding soil is to be firmly tamped at each check slot.

d. Overlap. Where more than one width of material is required, edges shall overlap a minimum of 4 inches; ends at junction slots shall overlap a minimum of 12 inches, and the upslope section of mesh will be on top.

e. Terminal Folds. Down-hill ends of the jute mesh shall be folded under approximately 4 inches and stapled in place.

f. Stapling. Staples will be inserted through the mesh along edges, overlaps, and in the center of all jute mesh strips at intervals not greater than 3 feet. All anchor slots, junction slots, check slots, and terminal folds shall have five staples spaced not more than 9 inches on center across their widths.

g. Over-Seeding. After the jute mesh has been secured in place and immediately prior to rolling, all areas disturbed by installation of the jute mesh shall be over-seeded using the appropriate seed mixture.

h. Maintenance and Repair. The Contractor shall maintain the areas of jute mesh until all work on the project is completed and accepted. Prior to acceptance of the work, if staples have become loosened or raised, or if jute mesh has become loose, torn or undermined by any cause, the damaged areas shall be reshaped, refertilized, reseeded and the jute mesh shall be repaired or replaced according to these Specifications, to the satisfaction of the Engineer and with no additional compensation.

L.05.03.2 Excelsior Matting.

a. General. The areas to receive excelsior matting shall be brought up to the lines and grades indicated, with a smooth surface free of depressions and eroded areas that would allow water to collect or flow under the matting. Applications will be made immediately after seeding; matting shall be applied evenly without stretching and must lie smoothly to fit the contour of the finished grade, parallel to and in the same direction as the surface flow of storm water.

b. Abutting Ends. The adjoining ends shall be butted and where more than one width of material is required they are to be laid parallel to one another with the edges butted snugly.

c. Stapling. The matting shall be held in place by means of staples driven vertically into the soil. Staples shall be spaced not more than 2 feet in three rows for each strip, with one row along each edge and one row spaced 12 inches apart across their width.

d. Maintenance and Repair. The Contractor shall maintain the excelsior matted areas until all work on the entire contract has been completed and accepted. Maintenance shall consist of the repair of areas damaged by erosion, wind, fire, or other causes. Damaged areas shall be repaired to re-establish the condition and grade of the soil prior to application of the matting and shall be reshaped, refertilized, reseeded and the excelsior matting shall be repaired or replaced according to these Specifications, to the satisfaction of the Engineer and with no additional compensation to be made therefore.

L.05.03.3 Erosion Control Blankets. The Contractor shall place erosion control blankets in accordance with **Subsection L.05.03.2;** above.

L.05.03.4 Adhesive Mulch Stabilizer.

a. Preparation. Mixing shall be performed in a tank with a minimum capacity of 500 gallons, with a built-in, continuous agitation or recirculation system of sufficient operating capacity to produce a homogeneous slurry of adhesive mulch stabilizer and water, or adhesive mulch stabilizer, seed, fertilizer, cellulose fiber mulch and water in the designated unit proportions. With the agitation system working at half speed, water shall be added to the tank at the same time as the adhesive mulch stabilizer, and good recirculation shall be established.

Adhesive mulch stabilizer shall be mixed in the proportion of 1 gallon of stabilizer to 5½ gallons of water. A resulting mix of 130 gallons of adhesive mulch stabilizer to 715 gallons of water shall be applied per acre or in accordance with the manufacturer's recommendations. If the manufacturer's recommendations are followed, the Contractor shall provide them to the Engineer for approval, prior to mixing and application. When applicable, seed and fertilizer shall be added when the tank is two-thirds full and shall be batched in accordance with manufacturer's guidelines. Application of the slurry shall commence immediately when the tank is full.

b. Application. The slurry shall be applied in a sweeping motion, at the above specified rate and at which rate which will provide the designated amounts of adhesive mulch stabilizer and when applicable seed, fertilizer and cellulose fiber mulch per acre, in a continuous uniform and even coat. The nozzle shall produce a spray that does not concentrate nor wash down the material.

L.05.03.5 Straw Mulch. Straw shall be applied to seeded areas by hand or blower at the rate of 0.62 to 0.82 pounds per square yard (1½ to 2 tons per acre). The Contractor shall be careful not to distribute straw on to new or existing plant material, pavement surfaces, (driveways, roads, or sidewalks) or other areas not designated on the Plans to receive straw. Straw placed on areas not designated and/or directed by the Engineer shall be removed immediately by the Contractor.

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SECTION L.06

PLANTING

L.06.01 DESCRIPTION. This work consists of furnishing, planting, watering, mulching, staking and guying trees, shrubs, vines, perennials, ornamental grasses, ground covers and bulbs of the type and size as indicated on the Plans, in accordance with these Specifications or as directed by the Engineer.

L.06.02 MATERIALS. Plant materials, antidesiccant, loam, fertilizer, bone meal, mulch, water, stakes, guy webbing fabric, and herbicide shall conform to the applicable requirements of **SECTION M.18; LANDSCAPING MATERIALS.**

L.06.03 CONSTRUCTION METHODS.

L.06.03.1 General. Should the Contractor disturb or damage any areas not shown on the Plans or designated by the Engineer, payment will be withheld until all damaged and/or disturbed areas are repaired with materials equal to or better than that which was existing. This shall include all previously seeded and/or sodded areas.

All work shall be performed under the direct supervision of the Engineer. No payment will be made for work performed when the Engineer is not present.

All persons performing planting or pruning operations shall possess a current Rhode Island Arborist License or be directly supervised by an individual who does. Herbicides shall be applied by only those individuals who possess a current Rhode Island Commercial Applicators License.

L.06.03.2 Planting Dates. All plant material shall be planted during the Spring or Fall planting season as indicated below. No planting shall be performed in frozen ground, or when snow covers the ground. The Engineer may suspend work when he/she determines soil or weather conditions are unsuitable for planting operations. The Contractor may resume work when directed by the Engineer.

a. Balled and Burlapped and Container Material-Deciduous:

Spring: March 1 to June 30
Fall: September 1 to December 15

b. Balled and Burlapped and Container Material – Evergreen (broadleaf and needled):

Spring: April 1 to May 15
Fall: August 15 to October 15

Planting at other than the above time will be allowed only with the written permission of the Engineer. The Engineer may suspend work when he/she determines that the soil or weather conditions are unsuitable for planting. The Contractor may resume work when directed by the Engineer.

Those species known to be Fall Digging Hazards shall be dug during the Spring season only. Fall planting of these species shall be permitted only with certification from the nursery, of the time of digging

and shall be at the discretion of the Engineer.

L.06.03.3 Selection, Tagging, Shipment, and Storage. The Engineer shall inspect and tag, at the nursery, all plants proposed for a specific contract. The Contractor shall give 7-days notice to the Engineer prior to any tagging operations. All plant material shall meet the American Association of Nurseryman Standards for Nursery Stock, latest edition and its amendments. Only plants which are hardy to Zone 6 or lower, as determined by the USDA shall be accepted. APPROVAL OF PLANTS IN THE NURSERY ROW DOES NOT GUARANTEE FINAL ACCEPTANCE IF THE PLANT IS BADLY DUG, DAMAGED IN TRANSIT, POORLY PLANTED, INADEQUATELY MAINTAINED, OR FOR ANY REASON IS IN POOR CONDITION AT THE TIME OF DELIVERY TO THE CONTRACT SITE. ALL PLANT MATERIAL INSPECTIONS AND TAGGING WILL BE MADE AT THE EXPENSE OF THE CONTRACTOR.

All plant materials shall be dug and handled in accordance with the American Association of Nurseryman's Standards for nursery stock, latest editions, and its amendments. All shipments of plant materials by the Contractor shall comply with all nursery inspection and plant quarantine regulations of the states of origin and of destination as well as with the Federal regulations governing the interstate movement of nursery stock. A certificate of inspection shall accompany each package, bale, box or carload lot shipped or otherwise delivered. When more than one variety of a species, or more than one species of a genus is required for a project, each plant or bundle of plants shall be tagged as to variety and/or species prior to delivery to the job site. A certificate of compliance for any or all plant materials shall be required at the time of delivery to the job site.

Plants received by the Contractor shall be kept moist, fresh and protected against exposure to sun, wind and freezing temperatures whether in the receiving yard, in transit, while being handled or in temporary storage on the job site awaiting planting. Balled and burlapped plants shall have their rootballs covered by earth, wood chips, cloth, straw or other suitable material which shall be kept moist.

Plant material shall be covered with a suitable tarpaulin while in transit. Damage to plant material, prior to its acceptance on the job site by the Engineer, shall be the responsibility of the Contractor.

L.06.03.4 Substitution. No substitutes in kinds and size of plant materials will be made without the express written consent of the Department. The Contractor shall notify the Engineer, in writing, regarding requests for plant material substitutions. The Department reserves the right to request the Contractor to submit one letter from each of four different supply sources for plant materials; three sources are to be of the Contractor's selection; one source is to be of the Department's selection. Letters must clearly outline the original plant material(s), the substitute plant material(s) and why the substitution is necessary.

L.06.03.5 Layout and Excavation of Plant Holes. Plant material locations and bed outlines shall be staked on the project site in accordance with the Plans by the Contractor, before any plant pits or beds are excavated. The Contractor shall notify the Engineer at least 24 hours, excluding weekends and holidays, prior to the starting date of layout operations. All staked locations shall be approved by the Engineer prior to the excavation of plant holes. Excavation for planting beds and individual trees shall conform to the approved staked locations and outlines.

Holes dug for planting shall in all cases be large enough to include the complete root system of the plant or tree to be received and also sufficient amounts of approved backfill around the periphery of the

root ball. All sod, weeds, roots, cobbles and stones and other objectionable material excavated from the plant holes which is unsuitable for backfill shall be removed from the site immediately and legally disposed of.

The minimum plant hole size, unless otherwise specified, shown on the Plans, or directed by the Engineer, shall be as follows:

a. All Trees and Shrubs (Deciduous and Evergreen). The planting hole shall be twice the diameter of the rootball in width and no deeper than 2 inches less than the distance from the bottom of the rootball to the root collar (i.e. a 12-inch distance between the root collar and bottom of the rootball will require a 10-inch deep hole). Any excavation in excess of that required shall be replaced and compacted to 85 percent of maximum density.

b. Vines, Perennials, Ornamental Grass, and Ground Cover. The planting hole shall be three times the diameter of the rootball in width and equal to the depth from the bottom of the rootball to the level at which it was grown in the nursery. Any excavation in excess of that required shall be replaced and compacted to 85 percent of maximum density.

c. Bulbs. The depth of planting bed for bulbs shall be 2.5 times the bulb(s) diameter (at its widest point) or in accordance with the suppliers' guidelines for individual bulbs species. The width of planting beds shall be as indicated on the Plans or at the direction of the Engineer.

Any rocks or underground obstructions shall be removed to a depth necessary for planting as specified, unless alternate locations for the plantings are approved by the Engineer. If removal of obstructions results in a deeper hole than needed for planting, backfill material shall be added and compacted to 85 percent of maximum density to the correct depth.

L.06.03.6 Planting and Backfilling. All plant material shall be brought to the planting site in a well watered condition. Any dry or dehydrated plant material will not be accepted for planting. All plant material shall be set plumb and at such a level as specified in **Subsection L.06.03.5**, above.

All watering of plant material during the backfilling process shall be completed regardless of weather conditions and shall be waived only with the approval of the Engineer. The Contractor shall, at all times during the planting operation, have a watering truck on site and prepared for watering activities.

a. Balled and Burlapped Trees and Shrubs. Plants shall be handled in such a manner that the soil of the ball will not be loosened from the roots. Carefully place plant into the prepared pits and fill in around the ball to one-half the depth of the hole with loam. Thoroughly tamp the loam to 85 percent of maximum density. Fill remaining area of hole with water. Once water has completely drained loosen burlap and peel down at least the top one third. If wire baskets are used, cut and bend down top third of basket. Roots that have been wrapped around the ball within the burlap shall be made to lay in as natural a manner as possible.

Fill remaining area of hole with loam and thoroughly tamp to 85 percent of maximum density. Form a saucer around the edge of the backfilled hole by constructing a berm. The finish height of the compacted berm shall be 3 inches. No excess soil other than the berm will be allowed to remain within the plant saucer. Fill saucer area with water.

b. Container Grown Trees and Shrubs. Carefully remove the tree and/or shrubs from the container. Over the prepared hole, gently loosen the soil from around the root mass. Roots that are

wrapped around the ball within the container shall be made to lay in as natural a manner as possible. Spread root mass out in bottom of prepared hole and sift loam around the root mass to one-half the depth of the hole. Thoroughly tamp the loam to 85 percent of maximum density.

Fill the remaining area of hole with water. Once water has completely drained, fill remaining area of hole with loam and thoroughly tamp to 85 percent of maximum density. Form a saucer around the edge of the backfilled hole by constructing a berm. The finish height of the compacted berm shall be 3 inches. No excess soil including the berm will be allowed to remain within the plant saucer. Fill the saucer area with water.

c. Vines, Perennials, Ornamental Grasses, and Ground Cover. Carefully remove plant from container. Over the prepared hole, gently loosen the soil from around the root mass. Spread root mass out in bottom of the prepared hole and sift loam around the root mass to one-half the depth of the hole. Thoroughly tamp the loam to 85 percent of maximum density. Fill the remaining area of hole with water. Once water has completely drained, fill the remaining area of hole with loam and thoroughly tamp to 85 percent of maximum density. Form a saucer around the edge of the backfilled hole by constructing a berm. The finished height of the compacted berm shall be 3 inches. No excess soil will be allowed to remain within the plant saucer. Fill the saucer area with water.

d. Bulbs. Place bulbs, with the correct side up, into planting bed. Fill around individual bulbs so that loam covers the bottom half of the bulbs. Spread, by hand, bone meal over entire bulb planting bed to a rate not to exceed ½-pound per 25 square feet. Fill the remaining area of the planting bed with loam. Thoroughly tamp the loam to 85 percent of maximum density. Form a saucer around the edge of the backfilled planting bed by constructing a berm. The finish height of the compacted berm shall be 3 inches. No excess soil, including the berm, will be allowed to remain within the plant saucer. Fill saucer area with water. Once the water has completely drained, refill the saucer area with water.

L.06.03.7 Watering. All plant material shall be watered as described in **Subsection L.06.03.6; Planting and Backfilling,** and again within 72 hours. One additional watering may be needed and will be performed at the direction of the Engineer. All watering shall be completed unless otherwise directed by the Engineer. At each watering, the soil around each plant shall be thoroughly saturated.

The following is a guide for minimum requirements:

Trees:
2½” Caliper and less - Fifteen (15) gallons each. 3”
to 5” Caliper - Twenty (20) gallons each.
5½” Caliper and above - Twenty-five (25) gallons each.

Shrubs:
24” and less - Six (6) gallons each. More
than 24” - Ten (10) gallons each.

Vines, Perennials, and Ornamental Grasses - Three (3) gallons each.

Groundcovers and Bulbs - Two (2) gallons per square foot.

Water shall be applied at a controlled rate and in such a manner to ensure that the water reaches

the root zone (saucer) of the plant or plant bed and does not run off to or flood adjacent areas. Watering shall be completed in a manner which does not dislodge plants, erode soil or mulch, or cause damage to the saucer berm. Each saucer of individual plants on planting bed shall be completely saturated before moving on to the next site. The overhead hydroseeder spray nozzles shall not be used as watering devices. The hydroseeder can be used to transport and store water for watering operations and when a hose and nozzle are properly attached and approved by the Engineer can be used for watering operations.

L.06.03.8 Mulching. Mulch shall be applied after the first watering and no later than one week after planting. All areas to be mulched shall be free of weeds, stones, and other extraneous material.

Prior to the placement of mulch, the Contractor shall apply a pre-emergent weed control around all individual trees, shrubs, and shrub beds, and around all plant material to be mulched. Pre-emergent weed control shall be applied by a Rhode Island Licensed Commercial Applicator at a rate in accordance with the manufacturer's instruction and as approved by the Engineer. Mulch material shall be furnished and placed over all saucer areas of individual trees and shrubs and over the entire area of planting beds as indicated on the Plans or as directed by the Engineer. All mulch material shall be placed, spread, and raked to an even finish surface.

Where mulch abuts seeded or sodded areas, the edge of the planting area (for both individual trees and shrubs and bed areas) shall be cut smooth and clean. Mulch shall be placed carefully so as not to spill into adjacent areas. Any excess or spilled mulch shall be immediately removed.

a. Pine Bark Mulch. Pine Bark Mulch shall be placed to a depth of 3 inches and shall be no closer than 4 inches to the trunk of individual trees and shrubs in accordance with the Plans and these Specifications.

b. Woodchips. Woodchips shall only be used if expressly outlined on the Plans or as directed by the Engineer. Woodchips shall be placed to a depth of 3 inches and shall be no closer than 4 inches to the trunk of individual trees and shrubs in accordance with the Plans and these Specifications.

Prior to the application of woodchip mulch, the Contractor shall top dress all saucer areas for individual trees and shrubs, all shrub and vine beds, all perennials and ornamental grass beds with a 1-1-1 granular fertilizer at a rate of 2 ounces per square foot.

c. Mulching Vines, Perennials and Ornamental Grass. All mulch placed around vines, perennials, and ornamental grass shall be in accordance with the Plans and these Specifications with the exception of its depth. All mulch material (Pine Bark and Woodchips) shall be placed to a depth of 2 inches.

d. Mulching Bulbs. All mulch placed over bulb beds shall be in accordance with the Plans and these Specifications with the exception of its depth. All mulch material (Pine Bark and Woodchips) shall be placed to a depth of 2 inches and shall cover the entire bulb planting bed.

L.06.03.9 Staking and Guying. All stakes shall be set plumb and driven firmly 3 feet into the ground. The above ground stake height shall be no more than 8 inches above the point of attachment of the guy webbing. Two stakes shall be equally spaced around the tree and shall be located outside of the planting pit in undisturbed soil.

Guy webbing shall be attached to both stakes and intertwined at the tree trunk. The guy webbing

shall lay flat against the tree trunk; all kinks or wrinkles shall be removed prior to final attachment. The guy webbing shall be tight enough to remove slack but shall not cause deflection or strain to the plant.

All trees, deciduous and evergreen, shall be staked unless otherwise directed by the Engineer. The guy webbing shall be attached at a point no higher than one-half the height of the tree or lower than one-third the height of the tree. Additional staking may be required and shall be at the discretion of the Engineer.

The guy webbing shall be attached to the stake in a manner that the finish level of the webbing shall be parallel to the ground. Stakes and guy webbing shall present a uniform appearance when installation is complete.

Stakes and guy webbing shall be removed within one year of the installation of the plants unless otherwise directed by the Engineer.

L.06.03.10 Pruning. Pruning of all plants shall be performed by or under the direct supervision of a Rhode Island Licensed Arborist skilled in this work and in accordance with currently accepted horticultural practice. Only broken, dead or injured branches shall be removed. All cuts shall be made parallel to and as close to the branch or stem collar as possible. All cuts shall be made in a manner which prevents damage to the bark. Broken roots shall be pruned on the plant side of the break. The foregoing shall be performed at the time of planting. Die back shall be pruned before final acceptance.

Pruning shall not deform nor destroy the typical shape or symmetry of the plant. The leader of the tree shall not be cut unless directed by the Engineer. All pruning tools shall be disinfected, sharp, and approved by the Engineer.

Tree paint shall not be used on any cuts except on Quercus Species with a cut of 1 inch and greater.

L.06.03.11 Clean-up. All areas disturbed by planting operations shall be left in a clean and orderly condition. Excess soil and rubbish shall be disposed of in a legal, off site location. All grasses or sodded areas disturbed shall be restored to a condition satisfactory to the Engineer but shall be no less than the condition prior to the planting operation. All reseeding or sodding shall be in accordance with **SECTIONS L.02** and **L.03**, respectively, of these Specifications.

L.06.03.12 Antidesiccant Application. Antidesiccant shall be applied to plant material as specified and under the following conditions:

a. Spring Applications. All evergreen and deciduous plant material (trees, shrubs, and vines) planted during the Spring season on exposed and/or windy site or as directed by the Engineer shall receive an application of antidesiccant within ten days after the planting operation. Antidesiccant shall not be applied during periods when the temperature is 90°F or hotter.

b. Fall Applications. All evergreen plant material (trees, shrubs and vines), regardless of time of planting or planted location, shall receive an application of antidesiccant between November 15 and December 15.

All antidesiccant applications shall be in accordance with the manufacturer direction for mixture and temperature range and shall not be applied in the rain. Antidesiccant application shall cover all sides of

the leaf or needle.

L.06.03.13 One-Year Establishment Period. All plant material shall receive a One-Year Establishment (Guarantee) Period. During this time, the Contractor shall employ currently accepted horticultural practices to keep all plant material installed in a living, healthy condition up to the date of final acceptance, which shall be one full calendar year following the satisfactory completion of the planting activities as confirmed, in writing, by the Engineer.

During this period, the Contractor shall water, weed, cultivate, prune, mulch and repair, replace or readjust guy webbing and stakes, as may be required or as directed by the Engineer. The Contractor shall reshape plant saucers, repair wash outs and gullies, replace lost mulch, keep all planting sites free from weeds and do other work necessary to maintain the plant material in a healthy, growing condition.

All dead, dying, or rejected plant material, as determined by the Engineer, shall be promptly removed from the project during the period of establishment, and shall be replaced by the Contractor in kind, quantity and size as originally specified, with live, healthy specimens selected and planted in accordance with these Specifications. All replacement plant material shall, from the time of installation, receive a one-year establishment period, in accordance with this Subsection.

a. Failure to Perform One-Year Establishment Period. If the Engineer decides that the One-Year Establishment Period tasks in the Contract have not been adequately performed as specified, the daily charge set forth in **Special Provision Code L.06.1000** will be deducted from monies due the Contractor as a charge for failure to comply with this Specification. Moreover, the stated daily charge will continue each consecutive calendar day thereafter until the deficiencies noted have been corrected to the complete satisfaction of the Engineer.

END OF SECTION