SPECIFICATIONS

PSJA I.S.D.

PSJA ISD BUELL CENTRAL HS & CLOVER ELEMENTARY SCHOOL RE-ROOFING BID #18-19-054
Pharr, Texas 78577
&
San Juan, Texas 78589

More Attentive Service

MILNET ARCHITECTURAL SERVICES

608 S. 12th Street
McAllen, Texas 78501

Phone: 956-688-5656
Fax: 956-687-9289
Email: milnet@swbell.net

MAS Project No. 219005
Set No.

PSJA ISD BUELL CENTRAL HS & CLOVER ELEMENTARY SCHOOL RE-ROOFING BID #18-19-054

PROJECT MANUAL

Plans and Specifications – Project No. 219005

FOR
PSJA INDEPENDENT SCHOOL DISTRICT
PSJA ISD BUELL CENTRAL HS & CLOVER ELEMENTARY RE-ROOFING

PHARR, TEXAS 78577
&
SAN JUAN, TEXAS 78589

TEXAS BOARD OF ARCHITECTURAL EXAMINERS
333 Guadalupe, Suite 2-350, AUSTIN, TX 78701-3942
(Tel: 512/305-9000)
HAS JURISDICTION OVER INDIVIDUALS LICENSED UNDER
THE ARCHITECT'S REGISTRATION LAW
ARTICLE 249a, VERNON'S CIVIL STATUTES".

MILNET ARCHITECTURAL SERVICES, PLLC
608 S. 12th St.
McALLEN, TEXAS 78501
(956) 688-5656 - FAX (956) 687-9289

Pharr-San Juan-Alamo I.S.D.
PSJA ISD BUELL CENTRAL HS &
CLOVER ELEMENTARY RE-ROOFING BID #18-19-054
Alamo, TX 78516 & San Juan TX 78589
MAS Project No. 219005

END OF TABLE OF CONTENTS

SECTION 00 11 00 — ADVERTISEMENT AND INVITATION

PART 1 - GENERAL

1.1 PROJECT DESCRIPTION:

A. This project consists of re-roofing the PSJA Buell Central High School roofs and PSJA Clover Elementary School roofs, scope of work also consists of accent painting with elastomeric coating as Alt#1.

1.2 INSTRUCTIONS TO BIDDERS:

A. Refer to Section 00 21 13 – Instructions to Bidders.

1.3 PRE-BID CONFERENCE:

A. The purpose of the Pre-Bid Conference is to answer any questions that any bidder may have. This is the last date for questions. All questions must be asked in a written format only and directed to Emily Garza Director of Purchasing PSJA I.S.D.- Purchasing Department, 601 E. Kelly, Pharr, Texas 78577/ (956) 354-2000 Phone – (956) 354-3019 Fax, emily.garza@psjaisd.us Email and Rudy Molina, AIA, Milnet Architectural Services, 608 S. 12th St., McAllen, Texas 78501/ (956) 688-5656 Phone – (956) 687-9289 Fax, rudym@milnet-archservices.com Email and Juan Martinez juanmart@milnet-archservices.com . All questions will be answered in a written addendum only.

B. Date and Time: Thursday, August 15, 2019 at 10:00am

C. Location: Administration Building/Business Services Conference Room #205
601 E. Kelly, Pharr, Texas 78577

D. OPENING OF BIDS:

E. Place:
1. Competitive sealed bids will be received at the office of:

Owner: Administration Building/Purchasing Department Room #249
Address: 601 E. Kelly, Pharr, Texas 78577
Attention: Mr. Emily Garza
Director of Purchasing Department

B. Date: **Thursday, August 29, 2019**

C. Hour: **4:00 P.M.**

1.4 REJECTION:

A. The Owner reserves the right to reject any or all Bids, and to waive any irregularities or formalities.

END OF SECTION

SECTION 00 11 16 - REQUEST FOR COMPETITIVE SEALED BIDS

PROJECT: PSJA ISD Buell Central High School & Clover Elementary School Re-Roofing

Buell Central High School
218 E. Juarez
Pharr, TX 78577

Clover Elementary School
800 E. Carroll Rd.
San Juan, Texas 78589

OWNER: Pharr San Juan Alamo I.S.D.

ARCHITECT: Milnet Architectural Services
608 South 12th Street
McAllen, Texas 78501

RFCSB DEADLINE: **Thursday, August 29, 2019 @ 4:00 pm**

INVITATION: Your firm is invited to submit Competitive Sealed Bids to the Owner, at the Owner's address indicated above, for the work described above, on or before the RFCSP deadline indicated above.

PRE-BID CONFERENCE: A Pre-Bid Conference will be conducted at the Administration Building/Business Services Conference Room #205 at, 601 E. Kelly, Pharr Texas 78577 on **Thursday, August 15, 2019 at 10:00am.** Site visit to each campus will follow the pre-bid meeting. All contractors proposing to submit competitive sealed bids on this project are strongly encouraged to attend.

INSPECTION OF SITE: The campuses are also accessible for inspection at other times upon notification to Mr. Jerry Lopez, PSJA ISD Project Manager at 956-354-2075. Bidders are encouraged to visit the campuses and assess existing conditions.

BID DOCUMENTS: Copies of the Bid Documents, including Drawings and Project Manual (Bid Requirements & Contract Forms, General Conditions of the Contract for Construction, Specifications) may be obtained**,** from the Architect's office by depositing $250.00 in cash, check or money order payable to Milnet Architectural Services PLLC. Deposits will be refunded in full if the complete, undamaged Contract Documents are returned within **10 days** of the Bid Deadline date. Copies of the Bid Documents are on file at the Architect's office, Builders Exchange of Texas, and at the local Associated General Contractors (AGC) and Dodge Plan Rooms.

BID SECURITY: Bidders will be required to provide Bid Security in the form of a Bid Bond in the amount of 5 percent of the largest possible total bid, including consideration of alternates, with each bid. A Bid Bond shall be issued by a Surety acceptable to the Owner and meeting the requirements of General Conditions of the Contract for Construction. Bid Bonds shall be prepared on forms meeting all the requirements of applicable States of Texas statues. Bid Bonds shall be issued on forms acceptable to the Owner and shall include, as a minimum standard, the information, requirements and standard illustrated by AIA Document A310, latest revised edition available. Failure to provide the Bid Bond with the bid will constitute a non-responsive bid and the bid will not be considered.

PERFORMANCE AND LABOR AND MATERIAL PAYMENT BONDS: The successful offeror will be required to provide 100% Performance and Labor and Materials Payment Bonds in strict conformance with all the requirements of the Contract Documents. Failure to do so will result in cancellation of the contract award and forfeiture of the Bid Bond security as liquidated damages.

BID WITHDRAWAL: Bids will be required to be submitted under a condition of irrevocability for a period of 60 days after submission. No bid may be withdrawn for a period of 60 days.

OWNER'S RIGHT OF REJECTION: The Owner reserves the right to accept or reject any or all offers (competitive sealed bids).

SECTION 00 21 13 — INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.1 SECURITY BOND:

A. Security bond in the amount of five (5%) of the Bid must accompany each Bid. Security bond shall be issued by an insurance company authorized to provide bonds on work in the State of Texas and shall be payable to the Owner.

1.2 DOCUMENTS:

A. Qualified offerors may obtain two (2) sets of Drawings and Project Manuals from: ***MILNET ARCHITECTURAL SERVICES PLLC, 608 S. 12th St., McAllen, Texas 78501 (956) 688-5656***

B. Subcontractors may obtain one (1) set of Drawings and Project Manuals from the office: ***MILNET ARCHITECTURAL SERVICES PLLC, 608 S. 12th St., McAllen, Texas 78501 (956) 688-5656***

C. A deposit of ***ONE HUNDRED DOLLARS ($100.00)*** will be required for each set of Drawings and Project Manuals issued. Partial sets will not be issued. Make checks payable to **MILNET ARCHITECTURAL SERVICES PLLC.**

D. Deposits will be refunded to offerors and subcontractors provided that all sets are returned to the **MILNET ARCHITECTURAL SERVICES PLLC** within **TEN {10}** days after date of opening of Bids. The offeror awarded the Project may retain the Construction Documents, and his deposit will be refunded upon execution of the Contract.

E. Deposit amount will be refunded as soon as practical, provided sets are in good condition. Costs of reproducing missing or damaged sheets or pages will be deducted from the deposit amount.

F. Offerors may obtain additional sets by paying the cost of reproduction, which will not be refunded, and complete sets shall be returned to the Architects.

G. Complete sets of Construction Documents shall be used in preparing Bids; neither the Owner nor the Architect assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Construction Documents.

H. The Owner or Architect in making copies of the Construction Documents available on the above terms, does so only for the purpose of obtaining Bids on the work and does not confer a license or grant for any other use.

I. Complete sets of Drawings and Project Manuals are on file at the following locations and subcontractors may examine them there:

-Milnet Architectural Services, 608 S. 12th St., McAllen, TX.

-A.G.C. PLAN ROOMS, (McAllen, Harlingen, Brownsville)

-DODGE REPORTS (Online)

1.3 EXAMINATION:

A. Offerors shall carefully examine the Construction Documents and the construction site to familiarize themselves with existing local conditions under which the Work is to be performed.

B. Extra payments will not be authorized for work that could have been foreseen by careful examination of the site. Submission of a Bid shall constitute acceptance, by the offeror, of existing site conditions ***work in and around the existing PSJA ISD Buell Central HS & Clover Elementary School*** as a part of the requirements for this work.

C. Offerors shall carefully examine the Construction Documents to verify that they agree with the Table of Contents in the Project Manual, the Index of Drawings Sheet on the Drawings, and the Cover Page of all Addenda. Offerors shall be responsible for obtaining any pages or sheets which have been inadvertently left out during the printing process.

1. All entities providing Bids on any portion of the work contained in the Construction Documents shall ascertain the completeness of the set of documents.
2. The Construction Documents are printed by an independent vendor and, although the Architect endeavors to check the documents for completeness, the Architect has, in the past, discovered missing or misplaced sheets in the Drawings and the Specifications.
3. Each entity receiving a set of Construction Documents shall check the indexes against the sheets or pages contained in the sets.
4. Should pages or sheets be found to be misplaced or missing, immediately notify the Architect who will give direction as to placement or provide the sheets or pages that are missing.
5. Failure to notify the Architect means the offeror is providing a Bid based on a complete set of Construction Documents.

1.4 INTERPRETATION OF CONSTRUCTION DOCUMENTS:

A. Offerors shall promptly notify the PSJA ISD Director of Purchasing of any ambiguity, inconsistency or error which they may discover upon examination of the Construction Documents or of the site and local conditions (48) hours prior to opening of Bids.

B. **Do not dimension the drawings. Any dimensions, questions, should be directed to the PSJA ISD Director of Purchasing.**

C. Submit all questions regarding clarification or interpretation of Construction Documents through the PSJA ISD Electronic Bid Portal or emailed to the PSJA ISD Director of Purchasing: ***PSJA ISD Purchasing Department (Attn: Emily Garza, Director of Purchasing)*** ***emily.garza@psjaisd.us***

D. Submit all questions by PSJA ISD Electronic Bid Portal or email only. Replies to questions will be issued to all Offerors in the form of an Addenda. General contractor and subcontractors shall submit questions in writing forty eight (48) hours prior to opening of Bids.

E. Make requests for interpretations as early as possible so as to allow adequate time to prepare and issue Addenda.

F. All Offerors shall check PSJA ISD Electronic Bid Portal prior to Opening of Bids to secure all Addenda. The Architect and PSJA ISD will not be responsible for oral clarification.

1.05 BASIS OF BIDS:

A. Bids shall be on a lump sum basis for each and or combined Bid packages and shall include all costs for these projects as described and indicated by the Construction Documents. Basis for Bids shall be on brands, materials, processes, products, persons or organizations, etc.,

B. Bids shall include all unit price costs and all Alternate costs as indicated by the Construction Documents and Bid Form.

1.06 ALTERNATES:

A. The Owner may, at his option, elect to proceed with any or all Alternates as set forth in the Contract Requirements.

B. Amount shown in Bid for each Alternate shall include profit, insurance, contingencies and other costs incidental to performance under under such Alternative.

C. Amount shown in Bid for each Alternate shall include the making of all changes and the installation of all materials and equipment necessary to the accomplishment of the Alternate requirements.

1.07 BIDS:

A. Bids shall be made on unaltered Bid Forms obtained from the PSJA ISD Electronic Bid Portal. No oral, telephone or personal Bids will be considered. All information required on form must be provided.

B. Where so indicated by the makeup of the Bid Form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written amount shall govern.

C. Any alteration or erasure to information entered in the blank spaces must be initialed by the signer of the Bid.

D. Original typed sheets shall be submitted, signed in longhand below the typed name of the person authorized to bind the offeror to a Contract.

E. Where offeror is a corporation, Bid must be signed with the legal name of the corporation followed by the name of the State of Incorporation and the legal signature of a person authorized to bind the corporation to a Contract.

F. Failure to submit a Bid on the form requested, or the inclusion of conditions, limitations or provisions distorting the intent of the Construction Documents, will render the Bid irregular and subject to rejection.

1.08 SUBMITTALS:

A. Submit Bid, to be submitted electronically through the PSJA ISD Electronic Bid Portal. The Bid Bond is to be hand delivered in a sealed envelope to the Purchasing Department.

1.09 MODIFICATION OR WITHDRAWAL OF BID:

A. A Bid may not be withdrawn or canceled by the offeror during the stipulated time period following the time and date designated for the receipt of Bids, unless the award of Contract has been delayed more than sixty (60) days.

B. Prior to the time and date designated for receipt of Bids, Bids submitted early may be modified or withdrawn only by notice to the party receiving Bids at the place and prior to the time designated for receipt of Bids.

B. Modification of Bids shall be in writing over the signature of the offeror or be by telegram; if by telegram, written confirmation over the signature of offeror must have been mailed and postmarked on or before the date and time set for receipt of Bids; it shall be so worded as not to reveal the amount of the original Bid.

C. Withdrawn Bid may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these Bid Instructions.

B. Security bond shall be in an amount sufficient for the Bid as modified or resubmitted.

1.10 CONSIDERATION OF BID:

A. Properly identified Bids received on time will be considered.

B. The Owner shall have the right to reject any or all Bid and in particular to reject a Bid not accompanied by any required security bond or data required by the Contract Documents or a Bid in any way incomplete or irregular.

C. The Owner shall have the right to waive any formality or irregularity in any Bid received.

D. If the Owner accepts any Alternates, he shall have the right to accept them in any order or combination.

E. It is the intent of the Owner to award a contract to the offeror submitting the Bid providing the "best value" to the Owner provided the Bid has been submitted in accordance with the requirements of the Contract Documents.

1.11 LOCATION AND ACCESS TO PREMISES:

A. The project site location: Refer to vicinity drawings.

B. The offeror shall have free access to the premises for the purpose of acquainting himself with the conditions, delivering equipment, and performing the work necessary to fulfill the contract. Offeror shall cooperate with the other contractors who may concurrently be working on the premises, integrating his work with that of others, all to the best interest of the total work and its orderly completion.

1.12 STATE SALES TAX:

A. This project is exempt from state taxes. A sales tax exemption certificate may be obtained from the State Comptroller.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 00 25 13 — PRE-BID MEETINGS

PART 1 - GENERAL

1.1 SITE INSPECTION:

A. A site inspection to obtain a clear understanding of the project requirements is strongly encouraged but attendance remains at the bidders' discretion; however, site access is restricted. This will be the bidder's only opportunity to inspect the site prior to the Bid Deadline Date.

1.2 PRE- BID MEETING:

A. A pre-bid meeting will be held at the time and place specified below for the purpose of answering any questions that any bidder may have. This meeting will provide bidders an opportunity to familiarize themselves with the existing conditions. All prime contractors and major subcontractors are strongly advised to attend. Others are invited to attend.

B. Date and Time: Thursday, August 15, 2019 at 10:00am

C. Location: Administration Building/Business Services Conference Room #205
601 E. Kelly, Pharr, Texas 78577

END OF SECTION

SECTION 00 41 00 — BID FORM FOR COMPETITIVE SEALED BIDS

RE: PSJA ISD
PSJA ISD Buell Central High School & Clover Elementary School Re-Roofing

ATTN: Emily Garza
Director of Purchasing
PSJA ISD

PART 1 - The Undersigned proposes to furnish all labor, services, materials, tools, and necessary equipment for the construction of the **re-roofing at PSJA ISD Buell Central High School & Clover Elementary School** and to perform the work required for the construction of said project at the location set out by the Drawings, Project Manual and Specifications, in strict accordance with the Contract Documents for the complete work.

In submitting this Bid, it is understood that this Bid may not be altered or withdrawn for sixty {60} days from submission date and that the Owner has reserved the right to reject any and all Bids.

The Undersigned certifies that this Bid is made in good faith, without collusion or connection with any other person, persons, partnership, company, firm, association, or corporation offering on this work, for the following sum or prices to wit:

PART 2 - BASE BID:

$_____ (Base Bid number)

$_____ (Base Bid words)

ALTERNATE #1: Elastomeric Coating & Wall Joint replacement

$_____ (Alt #1 number)

$_____ (Alt #1 words)

The Undersigned hereby declares that he has visited the site and has carefully examined the Drawings, Specifications, Contract Documents and Bid Documents related to the Work covered by his Bid.

Upon receipt of *"NOTICE TO PROCEED"*, the Undersigned will immediately execute the formal contract (Agreement).

The Undersigned agrees to commence work within ten (10) days of receiving the Notice to Proceed and to substantially complete the work on or before **270 calendar days from notice to proceed date.**

The Contract required will be that Standard Form of the American Institute of Architects and shall provide for payment on accounts of ***ninety-five (95%)*** percent of the value monthly.

The Bid, the Agreement, the Drawings, the General Conditions, Supplementary General Conditions, the Specifications and any Addenda shall all become a part of the Contract.

I hereby acknowledge receipt of the following Addendum:

_____

BONDING COMPANY (IES):

_____

(Name and address)

The Undersigned proposes to use the following Subcontractors, Manufacturers, Products, Material Suppliers for the principal portions of the work.

NAME(S) OF SUB-CONTRACTORS:

_____

_____

NAME(S) OF MANUFACTURERS:

_____

_____

NAME(S) OF MATERIAL SUPPLIERS:

_____

_____

_____ _____
Name of Company (Bidder) Printed Name

_____ _____
Address Title

_____ _____
City State Signature

_____
Telephone

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

SEAL

_____
Notary Public in and for the State of Texas

SEAL (If Bid is By a Corporation) _____

_____

END OF SECTION

SECTION 00 52 13 — AGREEMENT FORM - STIPULATED SUM

PART 1 - GENERAL

1.1 AGREEMENT FORM:

A. The modified “Standard Form of Agreement Between Owner and Contractor where the Basis of Payment is a Stipulated Sum”, AIA Document A101, 2017 Electronic Format Edition, will be the form used as a Contract for this Project.

B. General Condition AIA – A201 will be used in this project. See attached

C. A copy of the Standard AIA Document may be examined at the office of the Architect. Copies may be purchased from the American Institute of Architects, 1735 New York Avenue, N.W., Washington, D.C., 20006.

D. Modification may be made to the above Agreement & General Conditions A201 form or an Owner provided agreement and general conditions may be utilized. Either of which will be provided to contractor for review upon award of project, for final execution of the contract. See attached.

E. Section 00 73 00 Supplementary Conditions forms part of this Agreement.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 00 61 00 — PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

PART 1 - GENERAL

1.1 RELATED DOCUMENTS: PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND:

A. The Contractor shall, prior to the execution of the Contract, furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder in the amount of 100% of the Contract Price covering 100% performance and 100% payment, and with such sureties secured through the contractor's usual sources as may be agreeable to the parties.

B. The Contractor shall deliver the required bonds to the Owner not later than the date of execution of the Contract, or if the work is commenced prior thereto in response to a letter of intent, the Contractor shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be finished.

C. The Contractor shall require the Attorney-In-Fact who executes the required bonds on behalf of the surety to affix thereto a certificate and current copy of his Power of Attorney.

D. Any Payment Bond and Performance Bond furnished pursuant to the provisions of Art. 5160, Vernon's Texas Civil Statutes, connected with this project, shall be furnished by a corporate surety or corporate or corporate sureties in accordance with Article 7.19-1, Vernon's Texas Insurance Code, that has a stated capital and surplus (as reported by it to the Texas Insurance Commission in its most recent report) that is in excess of ten times the stated amount of the Payment Bond or the Performance Bond. Provided however, that if any Payment Bond or any Performance Bond is in an amount in excess of ten percent (10%) of the surety company's capital and surplus (as reported to the Texas Insurance Commission in its most recent report), as a condition to accepting the bond, the Owner must receive written certification and information, satisfactory in form and substance to the Owner, that the surety company has reinsured the portion of the risk that exceeds ten percent (10%) of the surety company's capital and surplus, with one or more reinsurers who are duly authorized, accredited or trusteed to do business in the State of Texas. For the purpose of this requirement, any amount reinsured by any reinsurer may not exceed ten percent (10%) of the reinsurer's capital and surplus (as reported to the Texas Insurance Commission by the reinsurer in its most recent report). In the event there is one or more reinsurer, the surety company must provide all necessary information and certification related to the current financial condition of the surety company and any and all reinsurers required by the Owner, together with copies of all reinsurance contracts with the surety company, before any such Payment Bond and Performance Bond is eligible to be considered acceptable by the Owner.

E. ALL CONTRACTORS SHALL SUBMIT THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE CORPORATED SURETIES PROVIDING THE PAYMENT BOND AND PERFORMANCE BOND AND THE LOCAL AGENT.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 00 62 76.13 — TAX EXEMPT ORGANIZATION CERTIFICATE

PART 1 - GENERAL

1.1 DEFINITION

A. This Contract is to be performed for an exempt organization as defined by Title 2; Subtitle E; Chapter 150 of the Texas Limited Sales, Excise and Use Tax Act and Section 151.311 of the State Statutes. The Owner will furnish the Contractor proof or Certificate of Exemption upon award of contract.

B. Bidder shall not include sales tax in their Bid.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 00 73 00 — SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS: SUPPLEMENTARY CONDITIONS

A. The Supplementary Conditions modify, change, delete from or add to the General Conditions and shall apply to each and every Section of the Work as though written in full therein.

B. The following paragraphs and subparagraphs take precedence over the General Conditions. Where any part of the General Conditions is modified or deleted by the Supplementary Conditions, the unaltered provisions remain in effect.

C. Paragraph numbers and titles refer to like numbers and titles in the General Conditions.

1.2 EXECUTION, CORRELATION AND INTENT

1.3 Add the following subparagraphs.

1.4 1.2.6 Scope paragraphs placed at the beginning of the SECTIONS present a brief indication of the principal Work included in that SECTION, but do not limit Work to subject mentioned nor purport to itemize Work that may be included.

1.5 The Relation of Specifications and Drawings shall be equal in authority and priority. Should they disagree in themselves, or with each other, bids shall be based on the most expensive combination of quality and quantity of work indicated. The appropriate Work, in the event of the above mentioned disagreements, shall be determined by the Architect, at no additional cost to the Owner.

1.6 1.2.8 Failure to report a conflict in the Contract Documents, prior to opening of Proposal, shall be deemed evidence that the Contractor has elected to proceed in the more expensive manner, at no additional cost to the Owner.

A. 1.2.9 The Specifications have been partially “streamlined” and some words and phrases have been intentionally omitted. Missing portions shall be supplied by inference as with notes on drawings.

B. 1.2.10 The words “approved”, “inspected”, “directed”, “selected”, and similar words and phrases shall be presumed to be followed by “by Architect”. The words “satisfactory”, “submitted”, “reported”, and similar words and phrases shall be presumed to be followed by “to Architect”. Words like “install”, “provide”, “locate”, “furnish”, and “supply” shall be construed to include complete furnishing and installing of construction. Words like “Bids”, “Bidders”, shall be construed to be “Proposals”, Proposers”, or “offers”, offerors”, respectively.

C. INFORMATION AND SERVICES REQUIRED OF THE OWNER

D. Delete 2.2.5 and replace with the following subparagraph.

E. 2.2.5The General Contractor will be furnished, free of charge, fifteen (15) sets of Drawings and Specifications for use in construction of this Project. Additional Drawings and Specifications will be

furnished the General Contractor at the Contractor's expense, but shall remain the property of the Architect. Cost of additional sets will be the cost of reproduction.

F. LABOR AND MATERIALS

G. Add the following subparagraphs 3.4.3 and 3.4.4 to 3.4:

H. After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 1 of the Specifications).

I. By making requests for substitutions based on subparagraph 3.4.3 above, the Contractor:

1. Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
2. Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
3. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects, all at no additional cost to the Owner.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.3.1 CHANGE TO READ:

Mutual acceptance of a lump sum properly itemized in accordance with 7.3.6.1, 7.3.6.2 and 7.3.6.3. Items listed in 7.3.6.4 and 7.3.6.5 shall be a part of the overhead scheduled 7.3.10 following. Items shall be supported by sufficient substantiating data to permit evaluation;

7.3.6 In the first sentence, delete the words "a reasonable allowance for overhead and profit" and substitute "an allowance for overhead and profit in accordance with Clauses 7.3.10.1 through 7.3.10.6 following:

7.3.6.4 DELETE the final "and" then add the following to the sentence: are a part of overhead schedule in 7.3.10 following".

7.3.6.5 ADD the following to the sentence: "are apart of overhead schedule in 7.3.10 following".

ADD the following subparagraph 7.3.10 to 7.3:

7.3.10 In subparagraph 7.3.6, the allowance for the combined and profit included in the total cost to the Owner shall be based on the following schedule:

1. For the Contractor, for Work performance by the Contractor's own forces, 10 percent of the cost.
2. For the Contractor, for Work performance by the Contractor's contractor, 6 percent of the amount due to the Sub-subcontractor.
3. 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.
4. For each Subcontractor, for Work performed by the Subcontractor's, Sub-subcontractor's, 6 percent of the amount due the Sub-subcontractor.
5. Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.6.
6. In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. 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.

8.1 DEFINITIONS

Add the following subparagraph.

8.1.5 The term working Day as used in the Contract Documents for extensions of time shall mean normal working day excluding weekends and legal holidays.

8.3 DELAYS AND EXTENSIONS OF TIME

Delete paragraph 8.3.2 and replace with the following subparagraph.

8.3.2 Any claim for extension of time shall be made in writing to the Architect not more than ten (10) days after the commencement of the delay; otherwise, it shall be waived. In case of a continuing delay only one claim is necessary. In case of claims for extensions of time because of adverse weather, such extensions of time shall be granted only when such adverse weather prevented the execution of major items of Work on normal working days

and exceeds the number of days included in the Contract time. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work. In the event an extension of time is granted such extension shall be the complete claim allowed. Contractor shall not be entitled to additional compensation such as, but not limited to, compensable extended overhead or lost profit.

9.6 PROGRESS PAYMENTS

Add the following subparagraph to 9.6.1

1. Unless otherwise indicated in the Agreement, the Owner will pay ninety-five (95%) percent of the amount due the Contractor on account of progress payment until final payment.

Add the following paragraphs to 9.11 to Article 9:

9.11 LIQUIDATED DAMAGES:

9.11.1 If the Contractor neglects, fails or refuses to complete the Work within the time specified in the Contract, or any proper extension thereof granted b the Owner, then the Contractor does hereby agree, as part consideration of the awarding of this Contract, to pay the Owner the amount of ***FIVE HUNDRED DOLLARS ($500.00)*** not as a penalty but as a liquidated damages for such breach of Contract as hereinafter setforth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contractor for completing the Work.

9.11.2 The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would, in such event, sustain.

9.11.3 TIME SPECIFIED IN CONTRACT IS AS FOLLOWS:

The Undersigned agrees to commence work within ten (10) days of Notice to Proceed and to substantially complete the work on or before 270 calendar days from notice to proceed date.

11.1 Article 11.1 Modify to include the following:

The Contractor shall furnish three (3) copies of insurance certificates to the Architect's office two (2) days after award of the project and before signing of the contract. The Certificate of Insurance shall include thirty (30) Day Notice of Cancellation; Architect and Owner shall receive the same notice in regard to any policy changes.

Owner and Architect shall be named as additional insured by the Contractor but not with respect to payment of premiums due under Contractor's policies. Coverage shall include any off site-work on adjacent public or private property.

Insurance Company/Carrier issuing the certificates must be listed by A.M. Best and have an "A" rating or better and based in the United States Mainland.

The insurance as required in Article 11.1 shall have "Minimum Limits" as follows:

A. WORKER'S COMPENSATION INSURANCE: Statutory Requirements-
   1. All States Endorsements (Broad)
   2. Voluntary Compensation
   3. Waiver of Subrogation Endorsement

B. MINIMUM EMPLOYER'S LIABILITY: $100,000/$100,000/$500,000

C. COMPREHENSIVE GENERAL LIABILITY INSURANCE MINIMUM LIABILITY AND COVERAGE:
   1. Bodily Injury $500,000 each person/$500,000 each occurrence
   2. Property Damage $100,000 each occurrence/$100,000 aggregate

   OR-

   3. $500,000 Combined Single Limit Per Occurrence Bodily Injury and Property Damage.

      a. Premises and operations coverage
      b. Explosion and collapse hazard coverage
      c. Underground hazard coverage
      d. Products/completed operation hazard coverage with limits and coverage continuing one (1) year after job completion.
      e. Broad Form property damage coverage
      f. Personal injury coverage
      g. Waiver of subrogation endorsement
      h. Contractual liability (Broad Form) coverage
      i. Independent contractors coverage (Owners, Architects, and Contractors protective)

NOTE: If General Liability coverage is written on a "Claims Made" basis, the Certificate of Insurance should so indicate. If so written, Contractor agrees that coverage so certified beyond job completion and that coverage written will apply to claims made DURING CONSTRUCTION AND FOR ONE (1) YEAR THEREAFTER.

D. AUTOMOBILE LIABILITY INSURANCE with minimum limits of:
1. Bodily Injury: $250,000 each person/$500,000 each occurrence
2. Property Damage: $250,000 each occurrence/$500,000 Combined Single Limit per Occurrence Bodily Injury and Property Damage.
3. Automobile Liability Insurance shall include coverage for owned, non-owned, and hired vehicles with limits not less than shown above.

E. OWNER'S AND CONTRACTOR'S PROTECTIVE LIABILITY:
1. Bodily Injury $500,000 Single limit each occurrence
2. Property Damage $250,000 each occurrence/$250,000 aggregate

F. UMBRELLA LIABILITY:

Minimum combined single limits $100,000 with same inception and expiration dates as underlying liability policies and with coverage no less broad than in primary program.

G. BUILDER'S RISK INSURANCE:

The Contractor shall FURNISH AND PAY FOR and issue a Certificate of Builder's Risk Coverage to the Owner/Architect in accordance with the General Conditions and Conditions of the Contract.

H. ARTICLE 11.4: PERFORMANCE BOND AND PAYMENT BOND:

Delete in its entirety and substitute the following:

11.4.1: Prior to signing of the Contract, the CONTRACTOR, at HIS/HER OWN EXPENSE, shall furnish a Performance Bond, and a Labor and Materials Payment Bond for one hundred (100%) percent of the Contract price on such form and with such sureties as the Owner may approve. ***Surety company furnishing the Bond must be listed by A.M. BEST and have an "A" rating or better and be based in the United States Mainland and authorized to provide such bonds on public work in the State of Texas.***

J. Any Payment Bond and Performance Bond furnished pursuant to the provisions of Art. 5160, Vernon's Texas Civil Statutes, connected with this project, shall be furnished by a corporate surety or corporate or corporate sureties in accordance with Article 7.19-1, Vernon's Texas Insurance Code, that has a stated capital and surplus (as reported by it to the Texas Insurance Commission in its most recent report) that is in excess of ten times the stated amount of the Payment Bond or the Performance Bond. Provided however, that if any Payment Bond or any Performance Bond is in an amount in excess of ten percent (10%) of the surety company's capital and surplus (as reported to the Texas Insurance Commission in its most recent report), as a condition to accepting the bond, the Owner must receive written certification and information, satisfactory in form and substance to the Owner, that the surety company has reinsured the portion of the risk that exceeds ten percent (10%) of the surety company's capital and surplus, with one or more reinsurers who are duly authorized, accredited or trusteed to do business in the State of Texas. For the purpose of this requirement, any amount reinsured by any reinsurer may not exceed ten percent (10%) of the reinsurer's capital and surplus (as reported to the Texas Insurance Commission by the reinsurer in its most recent report). In the event there is one or more reinsurer, the surety company must provide all necessary information and certification related to the current financial condition of the surety company and any and all reinsurers required by the Owner, together with copies of all reinsurance contracts with the surety company, before any such Payment Bond and Performance Bond is eligible to be considered acceptable by district.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 00 73 43 — WAGE RATE REQUIREMENTS

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Reference Instructions to Bidders for requirements regarding substitutions of materials and products.

D. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 GENERAL NOTES

A. **Do not dimension the drawings. Any dimensions, questions, should be directed to the Architect or Engineer.**

B. Contractor shall protect all streets and sidewalks and shall make all necessary repairs at his own expense.

C. Shall at all times protect the excavations, trenches, and/or the building from damage from rain water, ground water, backing up drains or sewers and all other water. He shall provide all pumps and equipment and enclosures to provide this protection.

D. Contractor shall provide all shoring, bracing and sheathing as required for safety and proper execution of the work and remove same when work is completed. Contractor shall be responsible for all scaffolding, shoring, bracing, sheathing, temporary construction and temporary walkways, etc., and shall hold harmless the Owner and Architect from any injury or litigation as a result of causes related to any scaffolding, shoring, bracing, sheathing, temporary construction and temporary walkways.

E. Contractor shall comply with the Trench Safety Law Requirements.

1.3 WAIVER OF LIEN:

A. A. In submitting a Bid, Contractor, if awarded the Contract, explicitly warrants that the Owner shall be held free of any claim or lien of any nature resulting from Contractor's pursuance or prosecution of the work. This shall cover any third party lien in any manner whatsoever concerning Contractor's performance or payment on this project.

1.4 PREVAILING WAGES:

A. A. Article 5159a, Vernon's Annotated Texas Civil Statutes as below noted apply to this project.

B. "Not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed, and not less than the general per diem wages for legal holiday and overtime work, shall be paid to all laborers, workmen and mechanics employed by or on behalf of the State of Texas, or by or on behalf of any county, district or other political subdivision of the State, engaged in the construction of public works, exclusive of maintenance work".

C. As a federally funded project, it shall follow the provisions of the Davis Bacon Act as shown below:

General Decision Number: TX190255 01/04/2019 TX255

Superseded General Decision Number: TX20180305

State: Texas

Construction Type: Building

County: Hidalgo County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.60 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/04/2019

BOIL0074-003 01/01/2017

	Rates	Fringes

BOILERMAKER	$ 28.00	22.35

ENGI0178-005 06/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 29.00	10.60
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic Crane 60 tons and above	$ 28.75	10.60
(3) Hydraulic cranes 59 Tons and under	$ 27.50	10.60

* IRON0084-011 06/01/2018

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 23.77	7.12

PLUM0412-004 04/01/2013

	Rates	Fringes
PLUMBER	$ 31.14	12.43

SUTX2014-031 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 16.17	0.00
CARPENTER	$ 14.21	2.22
CEMENT MASON/CONCRETE FINISHER	$ 12.46	0.00
ELECTRICIAN	$ 18.44	4.53
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation)	$ 11.54	2.17
IRONWORKER, REINFORCING	$ 12.01	0.00
IRONWORKER, STRUCTURAL	$ 15.04	4.34
LABORER: Common or General	$ 8.00	0.00
LABORER: Mason Tender - Brick	$ 10.00	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.89	0.96
LABORER: Pipelayer	$ 11.00	3.47
LABORER: Roof Tearoff	$ 10.06	0.00

OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.04	1.01
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93	0.00
OPERATOR: Bulldozer	$ 18.29	1.31
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 14.83	0.00
OPERATOR: Grader/Blade	$ 10.00	0.00
OPERATOR: Loader	$ 12.87	0.70
OPERATOR: Mechanic	$ 17.00	0.00
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00
OPERATOR: Roller	$ 12.70	0.00
PAINTER (Brush, Roller, and Spray)	$ 11.27	0.00
PIPEFITTER	$ 15.22	3.16
ROOFER	$ 11.42	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 18.40	2.12
SHEET METAL WORKER, Excludes HVAC Duct Installation	$ 21.13	6.53
TILE FINISHER	$ 11.22	0.00
TILE SETTER	$ 12.15	0.00
TRUCK DRIVER: Dump Truck	$ 12.39	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck	$ 12.50	0.00
TRUCK DRIVER: Water Truck	$ 12.00	4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave

for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010
08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

1.5 CONTRACTOR'S ASBESTOS FREE AFFIDAVIT:

A. A. In order to protect staff, employees and public in general from any unnecessary exposure to asbestos fibers, the Asbestos Hazard Emergency Response Act prohibits the use of asbestos containing materials in all forms in the construction and operation of this facility.

B. Failure to complete this waiver constitutes non-compliance with the job specifications. This document shall be attached to the Contract between Owner and Contractor.

1.6 AFFIDAVIT:

A. I, certify that I am familiar with the materials used in the construction of, and incorporated into, the construction described below. I further certify that to the best of my knowledge and belief no asbestos

containing materials, either friable or otherwise were used in the process of constructing or incorporated into the construction.

B. The undersigned, being duly sworn upon his/her oath deposes and says that he/she is the person making the foregoing statements and that they are made in good faith and are true in every respect.

C. Contractor's signature:

STATE OF

COUNTY OF

D. I, _____, a Notary Public in and for said County, in the State aforesaid, DO THEREBY CERTIFY THAT _____, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person, and acknowledge that he/she signed, sealed, and delivered said instrument as his/her free and voluntary act, for the uses and purposes herein set forth.

GIVEN UNDER MY HAND AND NOTARIAL SEAL THIS , DATE OF , 20

NOTARY PUBLIC: ,

MY COMMISSION EXPIRES: ,

(NOTARY SEAL)

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 25 00 – SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 SUBSTITUTION REQUIREMENTS

A. When material, article, or method is specified using name of proprietary product manufacturer, vendor, or method followed by phrase "or equal," specific item mentioned establishes basis upon which projects are to be built.

1. Other manufacturers' materials, articles, and methods not named will be considered as substitutions provided required information is submitted on “SUBSTITUTION REQUEST FORM” and will not require substantial revisions of Contract Documents.

2. This applies to specific construction methods when required by Contract Documents.

3. Substitution Requests must be filled out on enclosed “Substitution Request Form”.

B. Whenever material, article, or method is specified or described without phrase "or equal," no substitutions will be allowed.

C. Costs for redesigns due to substituted items are responsibility of Applicant.

D. In making request for substitution, Applicant/Contractor represents that he:

1. Has personally investigated proposed product or method and determined that it is equal in all respects to that specified.

2. Will provide same guarantee for substitution as for product or method specified.

3. Will coordinate installation of accepted substitution into work, making design and construction changes to complete work in all respects following the Contract Documents.

1.3 SUBMITTAL OF DATA FOR PROPOSED SUBSTITUTIONS

A. In order for substitutions that do not change design intent to be considered, submit no later than 10 days prior to bid date deadline, 3 copies of complete data set forth herein to permit complete analysis of proposed substitutions listed on submitted “SUBSTITUTION REQUEST FORM”.

1. For Products:
   a. Identification including manufacturer's name and address.
   b. Manufacturer's literature, including but not necessarily limited to:
      1) Product description, performance, and test data.
      2) Reference standards.
   c. Samples where appropriate.
   d. Name and address of similar projects on which product was used and dates of installation with contact name and telephone number.

2. For Construction Methods:
   a. Detailed description of proposed method.
   b. Drawings illustrating methods.
   c. Name and address of similar projects on which method was used and dates of use with contact name and telephone number.

3. Comparison of proposed substitution with product or method specified

4. Data relating to impact on construction schedule by proposed substitution.

5. Impact on other contracts.

1.4 APPROVAL OF SUBSTITUTION

A. Architect's decision regarding evaluation of substitutions will be final and binding.

B. All approved substitutions will be incorporated into the Contract Documents by Addendum.

PART 2 - PRODUCTS
NOT USED

PART 3 - EXECUTION
NOT USED

SUBSTITUTION REQUEST FORM

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01340 Submittals
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01340 Submittals
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

END OF SECTION

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Reference Instructions to Bidders for requirements regarding substitutions of materials and products.

D. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 PROJECT MANAGEMENT AND COORDINATION

A. Verify layout information shown on Drawings, in relation to property survey and existing benchmarks, before laying out the Work.

B. Coordinate construction to ensure efficient and orderly execution of each part of the Work.

C. Progress meetings will be held at Project site every two weeks. Notify Owner and Architect of meeting dates. Each subcontractor or other entity concerned with current progress or involved with planning or coordination of future activities, shall attend. The Contractor shall:

1. Prepare a progress meeting agenda.

2. Prepare a sign in sheet for each progress meeting.

3. Prepare minutes of each meeting and distribute to parties present.

1.3 CONSTRUCTION SCHEDULE

A. Prepare a horizontal bar-chart construction schedule. Provide a separate time bar for each activity and a vertical line to identify the first workday of each week. Use same breakdown of Work indicated in the Schedule of Values. As Work progresses, mark each bar to indicate actual completion.

1. Submit within twenty (20) days after date established for Commencement of the Work.
2. Coordinate each element with other activities. Show each activity in proper sequence. Indicate sequences necessary for completion of related Work.
3. Indicate Substantial Completion and allow time for Architect's procedures necessary for certifying Substantial Completion.
4. Schedule Distribution: Distribute copies to Owner, Architect, subcontractors, and parties required to comply with dates.

5. Updating: Revise the schedule after each meeting or activity where revisions have been made. Distribute revised copies to Owner, Architect, subcontractors, and parties required to comply with dates.

1.4 SUBMITTAL PROCEDURES

A. Coordinate submittal preparation with construction schedule, fabrication lead-times, other submittals, and activities that require sequential operations.

1. No extension of Contract Time will be authorized due to failure to transmit submittals in time to permit processing sufficiently in advance of when materials are required in the Work.
2. Architect will not accept submittals from sources other than Contractor.

B. Prepare submittals by placing a permanent label on each for identification. Provide a 4 by 5 inch space on the label or beside title block to record review and approval markings and action taken. Include the following information on the label:

1. Project name.
2. Date.
3. Name and address of Contractor.
4. Name and address of subcontractor or supplier.
5. Number and title of appropriate Specification Section.
6. Contractor's certification that materials comply with specified requirements.

C. Coordinate each submittal with other submittals and with work that does not require submittals.

D. Product Data: Mark each copy to show applicable choices and options. Include the following:

1. Data indicating compliance with specified standards and requirements.
2. Notation of coordination requirements.
3. For equipment data, include rated capacities, dimensions, weights, required clearances, and furnished specialties and accessories.

E. Shop Drawings: Submit newly prepared information drawn to scale. Do not reproduce Contract Documents or copy standard information. Submit 1 reproducible print and 1 blue- or black-line print on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches. Architect will return the reproducible print. Include the following:

1. Dimensions, profiles, methods of attachment, coordination with adjoining work, large scale details, and other information, as appropriate for the Work.
2. Identification of products and materials.
3. Notation of coordination requirements.
4. Notation of dimensions established by field measurement.
5. Identification of deviations from Contract Documents.

F. Samples: Submit Samples finished as specified and identical with the material proposed. Where variations are inherent in the material, submit sufficient units to show limits of the variations. Include product name or name of the manufacturer.

G. Architect will review each submittal, mark as appropriate to indicate action taken, and return copies less those retained. Compliance with specified requirements remains Contractor's responsibility.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 33 00 - SUBMITTALS

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Reference Instructions to Bidders for requirements regarding substitutions of materials and products.

D. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 WORK INCLUDED

A. Provide shop drawings, product data, physical samples and color samples as indicated herein and in each technical section of these specifications.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Additional submittal requirements specific to the particular section of the specifications.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

A. Prepare shop drawings using competent draftsmen, clearly and precisely showing the following:
   1. The size and gage of members.
   2. The method of anchoring and securing members of parts together.
   3. The quantity and location of each item.
   4. Other pertinent data necessary to show the Work to be done and where and how it is to be done.

B. Prepare Drawings to scale, including full size details as required to fix and illustrate the Work required. Do not use Contract Documents or reproductions thereof as shop drawing submittals.

C. Each sheet of Drawings shall be 30 x 40 inches maximum size with borders. Provide a title block in the lower right hand corner with the following information:
   1. Title of the sheet.
   2. Name and location of Project.
   3. Names of:
      a. Architect/Engineer.
      b. General Contractor.
      c. Manufacturer of the specified materials and equipment.

4. The date of the Submittal.
5. The date of each correction or revision.
6. **Submittal number including Division No.** (such as submittal no. 3 under Division 11 is numbered "11-03").

D. Fold drawings to 8-1/2x11 inch dimensions with title block exposed to top.

E. Check the Drawings and add any corrections of field measurements needed. Stamp and sign the Contractor's approval, checker's signature, and date of approval before submitting to the Architect. Shop Drawings which do not bear the Contractor's stamp or have not been reviewed by the Contractor, will be returned by the Architect without review or approval.

F. Number Shop Drawings consecutively. Indicate working and erection dimensions, arrangements, sectional views, necessary details including complete information for making connections with other Work, kinds of materials, and finishes.

G. Provide a transmittal letter in duplicate, pointing out any deviations from items, methods or named manufacturers included in the Specifications or on the Drawings. Note submittal file number including Division.

H. Submit **six (6)** blue line prints of each Shop Drawing sheet.

I. Make such corrections, changes, resubmit bound sets of Shop Drawings prints, as required herein, until approved is obtained. Any corrections or changes indicated on Shop Drawings shall not be considered as an extra work order.

2.2 PHYSICAL SAMPLES

A. Provide duplicate samples of items as specified. Samples shall be 12 inches square or 12 inches long unless noted otherwise. Minimum liquid samples shall be 1 pint. Installed materials shall match approved samples.

B. For Architect's permanent files provide one (1) 6" x 6" sample of all interior finishes, colors and materials (aluminum finish, glazing, plastic laminate, paint finish flooring materials, ceiling finish, etc.)

C. Provide a transmittal letter with each sample, listing the following:
1. Specification section title and paragraph specifying the material.
2. Name and location of Project.
3. Names of:
   a. Architect/Engineer.
   b. General Contractor.
   c. Manufacturer of the specified materials and equipment.
4. The date of the Submittal.
5. Submittal file number including Division.

D. If samples are not acceptable they will be returned directly to the Contractor for modification and resubmission.

E. If samples are acceptable, notification will be sent directly to the Contractor, and the sample retained for comparison with the complete Work.

2.3 MANUFACTURER'S PRODUCT DATA

A. Provide **six (6)** copies of pre-printed Product Data of items as specified. Carefully mark out all items not applicable to the specified item.

B. Standard catalogs, brochures, etc. including information not applicable to the project and not marked through, will be returned without review or approval.

C. Provide a transmittal letter with the Product Data from each manufacturer, listing the following information:
1. Name and location of Project.
2. Names of:
   a. Architect/Engineer.
   b. General Contractor.
   c. Manufacturer of the specified materials and equipment.
3. The date of the Submittal.
4. Submittal file number including Division.

D. If Product Data is not approved, one copy will be marked and returned directly to the Contractor for modification and resubmission.

E. If Product Data is approved, notification and one copy of the acceptable Product Data will be sent directly to the Contractor.

F. When requested by the Architect, provide six (6) copies of each ASTM Federal Specification, or other applicable documents referenced in the material Section.

PART 3 - EXECUTION

3.1 REVIEW PROCEDURE

A. Submittals will be reviewed with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. Architect shall be allowed a maximum review period of **fourteen (14)** calendar days. The review of a separate item shall not indicate a review of an assembly in which the item functions. Submittals that contain excessive errors or that are incomplete will be returned without review and approval and any delay caused thereby shall be the responsibility of the Contractor.

B. If any submittals are not approved as submitted, all copies will be returned directly to the Contractor for revision. The reviewed submittals will be returned to the Contractor as soon as practicable.

C. The Contractor shall make all revisions as noted and shall resubmit the required number of corrected copies of submittals, until no exceptions are taken. The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than those requested on previous submissions.

D. The review of submittals shall not relieve the Contractor of responsibility for deviations from the requirements of the Contract Documents unless the Contractor has submitted, in writing, such deviations and written approval has been given to each specific deviation. The review shall not relieve the Contractor from responsibility for errors and omissions in the Shop Drawings and samples.

E. No portion of the Work requiring a submittal shall commence until the submittal has been approved as designated in the Conditions of the Contract. All such portions of the Work shall be in accordance with the submittal that has been stamped with final "Reviewed Without Exceptions" note, or "Approved" note.

F. Materials and equipment specified or approved prior to beginning the Work are required to be used on the Project. Any proposed substitution resulting from no availability of specified items must be proven "better than" by the Contractor and approved in writing by the Architect. Substitutions included in submittals shall be so noted and brought to the Architect's attention in the submittal and on the transmittal. Failure to follow this procedure will render the substitution as not acceptable whether or not reviewed by the Architect.

G. The Contractor shall have the approved shop drawings at the site at all times for use in the construction of the Work. Failure of the Contractor to supply such drawings will be deemed sufficient cause to delay the Work until such drawings are available for field use and reference.

H. For submittals that will be reviewed by one of the Architect's consultants, these submittals shall be delivered directly to the Architect. The Architect will then be responsible to provide the Consultant with a copy of the submittal.

I. For submittals that will be reviewed by one of the Architect's consultants, do not send to the Consultant as part of the package any items which will be reviewed by the Architect. As an example, do not provide a single submittal package combining Structural Steel and Miscellaneous Metal Fabrications.

END OF SECTION

SECTION 01 35 16 — ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Reference Instructions to Bidders for requirements regarding substitutions of materials and products.

D. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 SECTION INCLUDES

A. Products and installation for patching and extending Work.

B. Transition and adjustments.

C. Repair of damaged surfaces, finishes, and cleaning.

1.3 RELATED SECTIONS

A. Section 01 11 00 – Summary: Work sequence and Phasing.

B. Section 01 73 29 – Cutting and Patching: Requirements and limitations for cutting and patching of work.

C. Section 01 50 00 – Temporary Facilities and Controls: Temporary enclosures, protection of installed work, and cleaning during construction.

PART 2 - PRODUCTS

2.1 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New Materials: As specified in product sections; match existing Products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that demolition is complete and areas are ready for installation of new Work.

B. Beginning of restoration Work means acceptance of existing conditions.

3.2 PREPARATION

A. Cut, move, or remove items as necessary for access to alterations and renovation Work. Store items scheduled for reinstallation. Replace and restore at completion.

B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

C. Remove debris and abandoned items from area and from concealed spaces.

D. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.

E. Close openings in exterior surfaces to protect existing work, salvaged, and stored items from weather and extremes of temperature and humidity. Temporarily seal wall cavities and substrates exposed by cutting, patching, and demolition work to prevent accumulation and trapping of moisture which will allow the development of mildew.

3.3 INSTALLATION

A. Coordinate work of alterations and renovations to expedite completion sequentially. Do not remove existing items which weatherproof buildings (windows, roofing, doors, exterior finishes etc.) until new materials and items are ready for installation.

B. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring products and finishes to specified condition. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes, in accordance with Section 01 73 29 – Cutting and Patching.

C. Install Products as specified in individual sections.

3.4 TRANSITIONS

A. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

B. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division. Consult Architect for direction on making transitions.

3.5 ADJUSTMENTS

A. Where removal of partitions or walls result in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

B. Fit work at penetrations of surfaces as specified in Section 01 73 29 – Cutting and Patching.

3.6 REPAIR OF DAMAGED SURFACES

A. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

B. Repair substrate prior to patching finish.

3.7 FINISHES

A. Finish surfaces as specified in individual Product sections.

B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Reference Instructions to Bidders for requirements regarding substitutions of materials and products.

D. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 SECTION REQUIREMENTS

A. Quality-control services include inspections, tests, and related actions including reports. Quality-control services are further specified in other Sections of these Specifications and shall be performed by independent testing agencies provided by Contractor or Owner, as specified.

1. Unless otherwise indicated, quality-control services required by authorities having jurisdiction will be provided by Owner.

B. Contractor is responsible for scheduling inspections and tests.

C. Retesting: Contractor shall pay for retesting where results of inspections and tests prove unsatisfactory and indicate noncompliance with requirements.

D. Auxiliary Services: Cooperate with agencies performing inspections and tests. Provide auxiliary services as requested. Notify agency in advance of operations requiring tests or inspections, to permit assignment of personnel. Auxiliary services include the following:

1. Access to the Work.
2. Incidental labor and facilities to assist inspections and tests.
3. Adequate quantities of materials that require testing, and assisting in taking samples.
4. Facilities for storage and curing of test samples.
5. Security and protection of samples and test equipment.

E. Duties of Testing Agency: Testing agency shall cooperate with Architect and Contractor in performing its duties. Agency shall provide qualified personnel to perform inspections and tests.

1. Agency shall promptly notify Architect and Contractor of irregularities or deficiencies observed in the Work during performance of its services.
2. Agency shall not release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
3. Agency shall not perform duties of Contractor.

F. Submittals: Testing agency shall submit a certified written report of each inspection and test to the following:

1. Owner.
2. Architect.
3. Contractor.
4. Structural engineer.
5. Authorities having jurisdiction, when authorities so direct.

G. Report Data: Reports of each inspection, test, or similar service shall include at least the following:

1. Name, address, and telephone number of testing agency.
2. Project title and testing agency's project number.
3. Designation (number) and date of report.
4. Dates and locations where samples were taken or inspections and field tests made.
5. Names of individuals taking the sample or making the inspection or test.
6. Designation of the product and test method.
7. Complete inspection or test data including an interpretation of test results.
8. Ambient conditions at the time of sample taking and testing.
9. Comments or professional opinion on whether inspected or tested Work complies with requirements.
10. Recommendations on retesting or reinspection.
11. Name and signature of laboratory inspector.

H. Testing Agency Qualifications: Engage inspection and testing agencies that are prequalified as complying with the American Council of Independent Laboratories' "Quality Assurance Manual" and that specialize in the types of inspections and tests to be performed.

1. Each testing agency shall be authorized by authorities having jurisdiction to operate in the state where Project is located.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 50 00 — TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Reference Instructions to Bidders for requirements regarding substitutions of materials and products.

D. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone and fax service, water, and sanitary facilities.

B. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, and water control.

C. Construction Facilities: Access roads, parking, progress cleaning, project signage and temporary buildings.

1.3 TEMPORARY ELECTRICITY

A. Cost: By General Contractor. Utilize existing power service if approved by Owner. Extend temporary outlets in NEC and OSHA approved manner to facilitate construction.

B. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

C. Provide main service disconnect and over correct protection at convenient location.

D. Provide sufficient and adequate distribution equipment, wiring, and outlets to ensure unimpeded progress of the Work.

E. Permanent convenience receptacles may be utilized during construction.

1.4 TEMPORARY LIGHTING

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 branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

D. Permanent building lighting may be utilized during construction.

E. Maintain lighting and provide routine repairs.

1.5 TEMPORARY HEAT

A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.

B. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in product sections.

1.6 TEMPORARY COOLING

A. If required for the proper installation of particular materials, systems, or equipment, provide and pay for cooling devices and cooling as needed to maintain specified conditions.

1.7 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidify, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Utilize existing ventilation equipment if approved by Owner. Extend and supplement equipment with temporary fan units as required to maintain clear air for construction operations.

1.8 TELEPHONE SERVICE

A. Provide, maintain and pay for telephone service to field office.

1.9 FACSIMILE SERVICE

A. Provide, maintain and pay for separate telephone line to be used solely for fax service to field office.

1.10 TEMPORARY WATER SERVICE

A. Utilize existing water service if approved by Owner for construction operations.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing as required.

1.11 TEMPORARY SANITARY

A. Provide and maintain required facilities and enclosures. Existing facility use is **not** permitted. Provide at time of project mobilization.

1.12 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas to protect existing facilities and adjacent properties from damage from construction operations and demolition. Barriers must isolate occupied use from construction activities. If and when needed, barriers must be capable of attenuating sound.

B. Provide protection for existing plant life and landscaped. Maintain plant life and landscaped areas as necessary during construction operations. Replace damaged plant life.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

D. Barrier plan and method subject to approval by the Architect and the Owner.

1.13 FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot high fence around construction site, equip with vehicular and pedestrian gates with locks. Fence must be capable of restricting entry by on-site facility users.

1.14 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protect for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

B. Provide temporary protection of existing wall cavities, substrates, and surfaces exposed to weather during cutting and minor demolition operations to prevent entrapment of moisture and development of mildew.

1.15 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection to prohibit damage and where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize 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. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic in all landscaped areas.

1.16 PARKING

A. Provide temporary surface parking areas to accommodate construction personnel. Existing site areas may be used if approved in advance by the Owner.

B. Contractor to propose plan for Owner concurrence and approval.

1.17 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.18 PROJECT IDENTIFICATION

A. Provide project sign. Refer to drawings for size and content.

B. Erect on site at location established by Architect.

C. No other signs are allowed without Owner permission except those required by law.

1.19 FIELD OFFICES AND SHEDS

A. Office: Weather tight with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture drawing rack, and drawing display table, phone and fax.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

C. Provide storage sheds and facilities to accommodate Work. Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01600.

D. Designated existing covered and uncovered hard paved areas and facilities may be used for field storage areas. Protect and secure existing areas used for storage. Upon completion of Work, clean, repair, and restore all existing areas used for storage and restore to acceptable condition.

1.20 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials prior to Substantial Completion.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 73 29 — CUTTING AND PATCHING

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Reference Instructions to Bidders for requirements regarding substitutions of materials and products.

D. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 SECTION INCLUDES

A. Requirements and limitations for cutting and patching of Work.

1.3 RELATED SECTIONS

A. Section 01 10 00 – Summary: Work by Owner or by separate Contractors.

B. Section 01 35 16 – Alteration Project Procedures.

C. Section 01 25 00 – Substitution Procedures.

D. Individual Product Specification Sections:
1. Cutting and patching incidental to work of the section.
2. Advance notification to other sections of openings required in work of those sections.
3. Limitations on cutting structural members.

1.4 SUBMITTALS

A. Submit written request in advance of cutting or alteration which affects:
1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate Contractor.

B. Include in request:
1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and Products to be used.

5. Alternatives to cutting and patching.
6. Effect on work of Owner or separate Contractor.
7. Written permission of affected separate Contractor.
8. Date and time work will be executed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Primary Products: Those required for original installation.

B. Product Substitution: For any proposed change in materials, submit request for substitution in accordance with Section 01 25 00 – Substitution Procedures.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, assess conditions affecting performance of work.

C. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Provide protection from elements for areas which may be exposed by uncovering work. Avoid unnecessary or extended exposure to weather of work exposed by cutting. Avoid entrapment of moisture or other deleterious mater between existing substrates and new work.

C. Maintain excavations free of water.

3.3 CUTTING

A. Execute cutting and fitting including excavation and fill to complete the Work.

B. Uncover work to install improperly sequenced work.

C. Remove and replace defective or non-conforming work.

D. Remove samples of installed work for testing when requested.

E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight-exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

3.4 PATCHING

A. Execute patching to complement adjacent Work.

B. Fit Products together to integrate with other Work.

C. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

D. Employ skilled installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.

E. Restore work with new Products in accordance with requirements of Contract Documents.

F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

END OF SECTION

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

1.2 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction

photographic documentation, damage or settlement surveys, property surveys, and similar final record information.

3. Submit closeout submittals specified in individual Divisions 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Divisions 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit sustainable design submittals required in Division 01 sustainable design requirements Section and in individual Division 02 through 33 Sections.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. MS Excel electronic file. Architect will return annotated file.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
g. Sweep concrete floors broom clean in unoccupied spaces.
h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.

o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
p. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Division 01 Section "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01700

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 COORDINATION

A. The General Conditions of the Contract for Construction and the Supplementary Conditions to the General Conditions of the Contract for Construction shall be considered as part of this section of the specifications.

B. Each Bidder shall be responsible for determining during the bidding period the extent that any addenda issued during the bidding period may affect this section of the specifications.

C. Reference Instructions to Bidders for requirements regarding substitutions of materials and products.

D. Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

1.2 SECTION REQUIREMENTS

A. Unless otherwise indicated, demolished materials become Contractor's property. Remove from Project site.

B. Items indicated to be removed and salvaged remain Owner's property. Remove, clean, and deliver to Owner's designated storage area.

C. Comply with EPA regulations and disposal regulations of authorities having jurisdiction.

D. Conduct demolition without disrupting Owner's use of the building.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Maintain and protect existing utilities to remain in service before proceeding with demolition, providing bypass connections to other parts of the building.

B. Locate, identify, shut off, disconnect, and cap off utility services to be demolished.

C. Employ a certified, licensed exterminator to treat building and to control rodents and vermin.

D. Conduct demolition operations and remove debris to prevent injury to people and damage to adjacent buildings and site improvements.

E. Provide and maintain shoring, bracing, or structural support to preserve building stability and prevent movement, settlement, or collapse.

F. Protect building structure or interior from weather and water leakage and damage.

G. Protect remaining walls, ceilings, floors, and exposed finishes. Erect and maintain dustproof partitions. Cover and protect remaining furniture, furnishings, and equipment.

H. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.

I. Promptly patch and repair holes and damaged surfaces of building caused by demolition. Restore exposed finishes of patched areas and extend finish restoration into remaining adjoining construction.

J. Promptly remove demolished materials from Owner's property and legally dispose of them. Do not burn demolished materials.

END OF SECTION

SECTION 06 10 53
MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Framing with dimension lumber.
   2. Rooftop equipment bases and support curbs.
   3. Wood blocking, cants, and nailers.
   4. Wood furring.
   5. Sheathing.

1.02 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   1. NELMA - Northeastern Lumber Manufacturers Association.
   2. NLGA - National Lumber Grades Authority.
   3. SPIB - Southern Pine Inspection Bureau.
   4. WCLIB - West Coast Lumber Inspection Bureau.
   5. WWPA - Western Wood Products Association.

1.03 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
   3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
   1. Preservative-treated wood.
   2. Fire-retardant-treated wood.
   3. Expansion anchors.
   4. Metal framing anchors.

1.04 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":
   1. Dimension lumber.
   2. Miscellaneous lumber.
   3. Plywood.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
   3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   4. Provide dressed lumber, S4S, unless otherwise indicated.
   5. Provide dry lumber with nineteen percent (19%) maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.
   6. Provide dry lumber with fifteen percent (15%) maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

B. Wood Structural Panels:
   1. Plywood
   2. Oriented Strand Board
   3. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
   4. Comply with "Code Plus" provisions in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."
   5. Factory mark panels according to indicated standard.

2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) / AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and [**one of**] the following:
      a) Chromated copper arsenate (CCA).
      b) Ammoniacal copper zinc arsenate (ACZA).
      c) Ammoniacal, or amine, copper quat (ACQ).
      d) Copper bis (dimethyldithiocarbamate) (CDDC).

e) Ammoniacal copper citrate (CC).
f) Copper azole, Type A (CBA-A).
g) Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.

2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry material after treatment to a maximum moisture content of nineteen percent (19%) for lumber or fifteen percent (15%) for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing members less than eighteen inches (18") above grade.
4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.03 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPA C20 (lumber) or AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664 for lumber or ASTM D 5516 for plywood.
2. Use treatment that does not promote corrosion of metal fasteners.
3. Use Exterior type for exterior locations and where indicated.
4. Use Interior Type A High Temperature (HT), unless otherwise indicated.

B. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

2.04 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 2 / Standard, Stud, or No. 3 grade and any of the following species:
1. Mixed southern pine; SPIB.
2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods; NELMA.
5. Northern species; NLGA.

6. Western woods; WCLIB or WWPA.

C. Other Framing: Construction, Stud, or No. 2 grade and any of the following species:
1. Douglas fir-larch; WCLIB or WWPA.
2. Douglas fir-south; WWPA.
3. Douglas fir-larch (north); NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Hem-fir (north); NLGA.
6. Southern pine; SPIB.
7. Mixed southern pine; SPIB.
8. Spruce-pine-fir (south); NELMA, WCLIB, or WWPA.
9. Spruce-pine-fir; NLGA.

2.05 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:
1. Rooftop equipment bases and support curbs.
2. Blocking.
3. Cants.
4. Nailers.
5. Furring.
6. Grounds.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with fifteen percent (15%) maximum moisture content and any of the following species:
1. Mixed southern pine; SPIB.
2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods; NELMA.
5. Northern species; NLGA.
6. Western woods; WCLIB or WWPA.

C. For exposed boards, provide lumber with fifteen percent (15%) maximum moisture content and any of the following species and grades:
1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine Premium or 2 Common (Sterling) grade; NELMA, NLGA, WCLIB, or WWPA.
2. Mixed southern pine, B & B Finish No. 1 grade; SPIB.
3. Hem-fir or Hem-fir (north), Superior or C & Btr Finish grade; NLGA, WCLIB, or WWPA.
4. Spruce-pine-fir (south) or Spruce-pine-fir, grade; NELMA, NLGA, WCLIB, or WWPA.
5. Western red cedar, A grade; NLGA or WWPA.

D. For concealed boards, provide lumber with fifteen percent (15%) maximum moisture content and any of the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
2. Hem-fir or Hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or Spruce-pine-fir, Construction or 2 Common grade; NELMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods, No. 2 Common grade; NELMA.
5. Northern species, No. 2 Common grade; NLGA.
6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.06 PANEL PRODUCTS

A. Miscellaneous Concealed Plywood: Exterior grade sheathing, span rating to suit framing in each location, and thickness as indicated but not less than three-fourths inch (3/4").

2.07 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. Where carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails: FS FF-N-105.

C. Wood Screws: ASME B18.6.1.

D. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.08 METAL FRAMING ANCHORS

A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and acceptable to authorities having jurisdiction.
B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

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

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and/or grounds, and similar supports to comply with requirements for attaching other construction.

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

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

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

F. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.02 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates and/or decks to support applied loading. Units shall be formed or shaped to be level and/or plumb. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.03 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.

3.04 PANEL PRODUCT INSTALLATION

A. Wood Structural Panels: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
Comply with "Code Plus" provisions in above-referenced guide.

END OF SECTION 06 10 53

SECTION 07 54 19
ADHERED MULTI-PLY ROOF SYSTEM
OVER METAL ROOF

PART 1 - GENERAL

1.01 AREAS COVERED

A. Existing metal roofs at Clover Elementary School and Buell Central High School as indicated on plans.

1.02 INSTALLER QUALIFICATIONS

A. Roofing Installer must be:
   1. Currently pre-qualified with the Owner in accordance with Owner's prequalification requirements.
   2. Currently in good standing with the manufacturer.

B. It shall remain each Contractor's responsibility to determine his current status with the manufacturer's certification plan.

1.03 QUALITY ASSURANCE

A. Applicator/Installer:
   1. Acceptable to roof material manufacturer for the manufacturer's warranty requirements.
   2. Five (5) years successful experience on projects similar in size and scope.
   3. Experienced in the type of roofing work required.
   4. Successfully completed previous projects warranted by the manufacturer.

B. Manufacturer Qualifications:
   1. A qualified manufacturer that has been UL Listed and has FM Approvals for membrane roofing system similar to that used in this project for a minimum of fifteen (15) years.

C. Manufacturer’s Observation Reports: Beginning with the commencement of the roofing system installation for the project and continuing through the completion of the roofing system installation and all its associated components, the Roofing System Manufacturer or their appointed representative shall provide weekly jobsite observations and written observation reports including digital photos as follows and this shall be confirmed in writing by the manufacturer and made part of the roofing submittals.

   1. Keep the Architect / Owner informed as to the progress, status, and quality of work as observed.
   2. Provide weekly jobsite observations no less than (2) hours per week throughout the installation of the roofing system and its associated components. Reports shall include detailed weekly reports to the Architect, Contractor, and Subcontractor along with digital photographs of work in progress. These reports and photographs shall be descriptive of actual work in progress, status, and condition, and be presented in a written format with digital color photographs.

3. Report to the Architect / Owner in writing any refusal or failure of the Contractor to correct installations, practices and/or conditions in conflict with the specifications and/or manufacturer's recommended guidelines called to the Contractor's attention.
4. It will be the sole responsibility of each bidder to ensure these conditions are to be met by the approved roofing system manufacturer and/or their appointed representative prior to bidding.

D. Testing Laboratory Services: Test results shall meet or exceed established standards.

E. Underwriters Laboratories, Inc.; Roofing Covering: Class A fire hazard classification.

F. Comply with governing local, state, and federal regulations, safety standards, and codes.

1.04 REFERENCES (INCLUDING LATEST REVISIONS)

A. American Society for Testing and Materials:
1. ASTM B 209 - 90, Specification for Aluminum and Aluminum Alloy Sheet and Plate
2. ASTM C 719 - 86, Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cycle Movement (Hockman Cycle)
3. ASTM C 794 - 80 (1986), Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
4. ASTM C 920 - 87, Specification for Elastomeric Joint Sealants
5. ASTM D 312 - 89, Specification for Asphalt Used in Roofing
6. ASTM D 1863 - 86, Specification for Mineral Aggregate Used on Built-up Roofs
7. ASTM D 2178 - 89, Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
8. ASTM D 2824 - 85, Specification for Aluminum - Pigmented Asphalt Roof Coatings
9. ASTM D 4586 - 86, Specification for Asphalt Roof Cement, Asbestos Free
10. ASTM A 361 - 90, Sheet Steel, Zinc-Coated (Galv.) by the Hot-Dip Process for Roofing and Siding
11. ASTM C 177, Test for Thermal Laboratory Services
12. ASTM C 728, Perlite Thermal Insulation Board

B. Federal Specifications:
1. LLL-I-535B
2. SS-A-701B
3. SS-C-153
4. SS-C-153C
5. SS-R-620B
6. TT-C-498C
7. TT-P-320D
8. TT-S-00227E
9. TT-S-00230C
10. SS-S-001534 (GSA-FSS)
11. L-P-375

C. Industry Standards:
1. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual
2. Single-ply Roofing Institute (SPRI) - A Professional Guide to Specifications Manual
3. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual
4. American Society of Civil Engineers – ASCE 7

1.05 SUBMITTALS

A. Samples and Manufacturer's Submittals: Submit prior to delivery or installation.
   1. Samples of all roofing system components including all specified accessories.
   2. Submit samples of proposed warranty complete with any addenda necessary to meet the warranty requirements as specified.
   3. Submit latest edition of manufacturer's specifications and installation procedures. Submit only those items applicable to this project.
   4. A written statement from the roofing materials manufacturer approving the installer, specifications and drawings as described and/or shown for this project and stating the intent to guarantee the completed project.
   5. Manufacturer's Equiviscous Temperatures (EVT) for the specified bitumen's as applicable.

B. Shop Drawings: Provide manufacturer's approved details of all perimeter conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings. Shop drawings shall be engineered drawings, digital or CAD. Hand sketches, copies or tracings of projects documents are not acceptable. Manufacturer's details are acceptable provided they are job specific and representative of actual conditions.

C. Maintenance Procedures: Within ten days of the date of Substantial Completion of the project, deliver to the Owner three copies of the manufacturer's printed instructions regarding care and maintenance of the roof.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

B. Deliver materials requiring fire resistance classification to the job with labels attached and packaged as required by labeling service.

C. Deliver materials in sufficient quantity to allow continuity of work.

D. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers.

E. Handle rolled goods so as to prevent damage to edge or ends.

F. Select and operate material handling equipment so as not to damage existing construction or applied roofing.

G. Moisture-sensitive products shall be maintained in dry storage areas and properly covered. Provide continuous protection of materials against wetting and moisture absorption. Store roofing and flashing materials on clean raised platforms with weather protective covering when stored outdoors.

H. Store rolled goods on end.

I. Protect materials against damage by construction traffic.

J. The proper storage of materials is the sole responsibility of the contractor and any wet or damaged roofing materials shall be discarded, removed from the project site, and replaced prior to application.

K. Comply with fire and safety regulations, especially with materials which are extremely flammable and/or toxic. Use safety precautions indicated on labels.

L. Products liable, such as emulsions, to degrade as a result of being frozen shall be maintained above 40° F in heated storage.

M. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day.

1.07 SITE CONDITIONS

A. Job Condition Requirements:
1. Apply roofing in dry weather.
2. Do not apply roofing when ambient temperature is below 40° F (4° C).
3. Coordinate the work of the contractor with the work to be performed by the Owner's personnel, to ensure proper sequencing of the entire work. The Owner's personnel will be erecting interior protection for equipment, if required. The contractor is to schedule his work so that adequate time is allowed for the Owner's personnel to perform the work. No roof work shall be performed until the Owner's personnel have completed erection of the interior protection in that area.
4. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with specifications.
5. Schedule the work so the building will be left watertight at the end of each day. Do not remove more roofing material than can be reinstalled in any working day.
6. All surfaces to receive new roofing shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Owner. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.
7. The contractor shall take all necessary precautions to protect the roof mat and deck from damage. The contractor shall be responsible for repairing all new areas of damage caused by the negligence of the contractor, at the contractor's expense. The Owner's on-site representative shall determine damage caused by contractor negligence.
8. The contractor shall follow local, state, and federal regulations, safety standards, and codes for the removal, handling, and disposal of asbestos containing materials, if present. When a conflict exists, use the stricter document.
9. Follow insurance underwriter's requirements acceptable for use with specified products or systems.
10. Due caution should be exercised so as not to alter the structural integrity of the deck. When cutting through any deck, care should be taken so as not to damage the deck or any part of the deck, such as post tension cables, etc.
11. The contractor is to verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. The contractor is to perform all work in such a manner as to avoid contact with the above-mentioned items.

12. Surface and air temperatures should be a minimum 45° F during applications of cleaner and waterproof coating and remain above 45° F for a minimum of four (4) hours following applications. Verify compatibility of cleaner with coatings, paints, primers and joint sealers specified. Advise Owner's representative of any problems in this regard prior to commencing cleaning operations.
13. Temporary Sanitary Facilities: The contractor shall furnish and maintain temporary sanitary facilities for employees use during this project. These will be removed after the completion of the project. All portable facilities shall comply with local laws, codes, and regulations.

B. Protection of Work and Property:
1. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations pertaining to asbestos as required shall be fulfilled by the contractor as part of his proposal.
2. Twenty-four Hour Call: The contractor shall have personnel on call 24 hours per day, seven (7) days per week for emergencies during the course of a job. The Owner's project manager is to have the 24 hour numbers for the contact. Contractor must be able to respond to any emergency call and have personnel on-site within two (2) hours after contact. Numbers available to the Owner's project manager are to be both home and office numbers for:
   a. Job Foreman
   b. Job Superintendent
   c. Owner or Company Officer

C. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds must be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.

D. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.

E. Use of Premises:
1. The contractor is advised that the Owner will occupy the building at all times, and the contractor must provide all safeguards required to protect personnel and to keep noise levels as low as reasonably possible for each operation.
2. The contractor shall:
   a) Coordinate work in such a manner as to not interfere with the normal operation of the building.
   b) Assume full responsibility for protection and safekeeping of products stored on premises.
   c) Agree to hold the Owner harmless in any and all liability of every nature and description which may be suffered through bodily injuries, including death of any persons by reason of negligence of the contractor, agents, employees, or subcontractors.

F. Cleaning and Disposal of Materials:

1. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.
2. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. A suitable scrap chute or hoist must be used to lower any debris. At completion, all work areas shall be left broom clean and all contractor's equipment and materials removed from the site.
3. All bituminous or roofing related materials shall be removed from ladders, stairs, railings, and similar parts of the building.
4. Debris shall be deposited at an approved disposal site.

1.08 WARRANTY

A. Twenty (20) Year NDL Total System Warranty: The complete roofing system shall be guaranteed for a minimum of twenty (20) years from the date of Substantial Completion for this project. Guarantee responsibilities shall be as follows:
   1. Roofing contractor shall guarantee the entire roofing system for a period of two (2) years from the date of Substantial Completion.
   2. The materials manufacturer shall guarantee the entire roofing system as supplied by system manufacturer for a total period of twenty (20) years from the date of substantial completion.
   3. Membrane manufacturer shall provide the written warranty as specified.
   4. The entire roofing system shall be guaranteed to be watertight and against any failures of workmanship and materials. Repair of the system, including materials and labor, shall be done at no cost to the Owner.
   5. Warranty repairs shall be performed by a certified installer. The repairs shall be performed in accordance with the manufacturer's written instructions and recommended procedures so as to not void the warranty.

B. During the proposal period each Contractor shall make arrangements with the materials manufacturer to provide the required warranty. Refer to Submittals Paragraph for requirements concerning submittals of warranty.

PART 2 - PRODUCTS

2.01 GENERAL

A. Compatibility: Provide materials that are recommended by manufacturers to be fully compatible with indicated substrates or provide separation materials as required to eliminate contact between incompatible materials.

B. Materials herein specified shall be supplied or approved in writing by the manufacturer issuing the warranty.

C. The white polyester reinforced fleece backed adhered PVC with Elvaloy® roofing system shall only be applied by manufacturer approved and trained roofing contractors.

D. The manufacturer shall have 15 years UL listing for the membrane to be used on the project. Membrane manufacturer shall have a minimum of 15 years FM approval, and 15 years manufacturing experience with the roofing membrane specified for this project.

E. All roofing and roof accessories shall be installed in compliance with manufacturer's current specifications and details.

F. All materials used on the project shall be asbestos free.

2.02 ROOFING MEMBRANE

A. The white 60 mil polyester reinforced fleece backed PVC with Elvaloy® membrane shall have the following minimum physical properties:

Property	Test Procedure	Physical Properties
Color	ASTM D 751	White
Thickness	ASTM D 751	60 mil (.060")
Thickness over Scrim	ASTM D 7635	.030"
Polyester Fleece Backing		5.5 oz.
Reinforcement Scrim		Polyester
Solar Reflectance Index (SRI)	ASTM E 1980	109

B. Basis of Design: Flex FB 60 Elvaloy® KEE Roof Membrane as manufactured by Flex Membrane International.

C. Approved Manufacturer's and Membranes:

1. Flex Membrane International Corp. / Flex FB 60 Elvaloy® KEE Roof Membrane
2. The Garland Company / KEE- Stone® FB 60 mil
3. Tremco Roofing & Waterproofing / TPA FB 60 mil Roof Membrane

2.03 FLASHING MEMBRANE

A. The flashing membrane shall be a white Elvaloy® polyester reinforced flexible sheet shall have the following minimum physical properties:

Property	Test Procedure	Physical Properties
Color	ASTM D 751	White
Thickness	ASTM D 751	60 mil (.060")
Thickness over Scrim	ASTM D 7635	.031"
Reinforcement Scrim		Polyester
Solar Reflectance Index (SRI)	ASTM E 1980	109

B. Basis of Design: Flex MF/R 60 Elvaloy® KEE Roof Membrane as manufactured by Flex Membrane International.

C. Approved Manufacturer's and Membranes:

1. Flex Membrane International Corp. / Flex MF/R 60 Elvaloy® KEE Roof Membrane
2. The Garland Company / KEE-Stone 60 mil
3. Tremco Roofing & Waterproofing / TPA Flashing Membrane 60 mil

2.04 NON-REINFORCED MEMBRANE

A. The non-reinforced membrane shall have the following minimum properties or approved equal.
1. Description: Non-reinforced thermoplastic white membrane, thickness approximately 45 mils.
2. Use: Inside/outside corners, multiangled intersections, sealant pockets and other conditions where molding of the membrane is required.

2.05 CAULKS

A. Sealant for use at coping joints, reglet joints, etc., shall be a one-component urethane non-sag, gun grade sealant designed for use in active exterior joints, and shall meet or exceed Federal Specification No. 1 TT-S-00230C, Type II, Class A, ASTM C 920. Where joint surfaces are contained or are contaminated with bituminous materials, provide manufacturer's modified-type sealant as manufactured by BASF, or approved equal.

B. To seal the leading edge of the membrane, to bond membrane at terminations with metal, and for open seam repair, sealant shall be a thermosetting, solvent free, non-slump, self-fixturing, multipurpose structural sealant which shall meet the following physical and performance properties, M-1 as manufactured by Chem Link Inc., or approved equal.

Properties	
Specific Gravity 1.62 (13.5 lbs./gallon)	
Viscosity 800,000 cps Brookfield RTV, TF spindle, 4 rpm 70 degrees F.	
Shear Strength (ASTM D-1002)	300 psi+ (7 day ambient cure)
Elongation @ break (ASTM D-412)	300% (7 day ambient cure)
Hardness Shore A (ASTM C-661)	50 – 55 (14 day ambient cure)
Tack free time (ASTM C-679)	35 minutes
Low temperature flex Minus 20 degrees F: PASS	
Slump (sag) (ASTM C-639)	Zero slump
Shrinkage (ASTM D-2453)	No measurable shrinkage (14 cay cure)
Service temperature	-40 degrees F to 200 degrees F

C. Polyether sealant: The joint sealant shall be a 100% solid, one-component, gun grade, non sag, polyether-base material. It shall be applicable for use at Kynar 500 coated metal, in, vertical, and overhead joints. The sealant shall cure under the influence of atmospheric moisture to form an elastomeric joint material. Materials shall comply to: ASTM C920, Type S, Grade NS, Class 50, Use T2, NT, M, A, G, and O; Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N, No. 81026; DuraLink as manufactured by Chem Link, Inc., or approved equal.

Properties	Results	Test Methods
Tensile strength, psi	250-300	ASTM D412
Peal strength, psi	25-30	ASTM C794

Elongation at break, %	750-800	ASTM D412
Hardness, Shore A	17-23	ASTM C661
Lap shear Strength, psi	150-175	ASTM D1002
Low temp. flexibility	Pass-10°F (-23°C) 1/4inch mandrel	ASTM D816
Service Temperature	-40°F to 200°F (-40°C to 93°C)	

2.06 BASE SHEET

A. Shall be Underwriters Laboratory approved and listed in the FM Global Approval Guide.

B. Shall be A Styrene Butadiene Styrene (SBS) 80 mils thick, smooth surfaced modified bitumen base sheet, tested in accordance with ASTM D 5147, as approved by field membrane manufacturer.

C. Basis of Design: Flex SBS 80 mil S/S Base Sheet Roof Membrane as manufactured by Flex Membrane International.

D. Approved Manufacturer's and Membranes:
1. Flex Membrane International Corp. / Flex SBS 80 Mil S/S Base Sheet
2. The Garland Company / Stress Base
3. Tremco Roofing & Waterproofing / POWERply Standard Smooth

2.07 FILLER FOR FLUTES

A. Expanded polystyrene flute filler insulation shall meet ASTM C578, Type VIII; one and one-fourth pound (1-1/4#) nominal density per ASTM C303, pre-cut and preformed with beveled edges to fill flute and match height to top of rib/flange.

2.08 COVER BOARD

A. Impact-resistant, nonstructural, specially engineered gypsum and cellulose fiber panels with 95% recycled content; uniform water-resistance throughout core and surface. Board size four feet by eight feet (4' x 8'), thickness 1/4" = R of 0.2; conforming to ASTM C 1278, meeting FM 4470 Class 1 criteria, classified by Underwriters Laboratories, and listed in the FM Global Approval Guide. Board will meet the following physical properties, Securock® Roof Board, as manufactured by USG Corporation, or approved equal.

Test	Typical Value	Test Method
Fire Resistance	Class A	UL 790
Permeance	≤ 30	ASTM C473
Surface water absorption	≤ 1.6 nominal grams	ASTM C473
Water resistance	Maximum 10% weight percentage gain	
Mold Resistance	Minimum rating of "10"	ASTM D3273

2.09 INSULATION

A. All insulation shall be approved in writing by the membrane manufacturer as to thickness, type, and manufacturer. All insulation must be approved for the specific application, Underwriters Laboratory approved, and be listed in the FM Global Approval Guide.

B. Polyisocyanurate Roof Insulation: Insulation shall be a single layer of rigid polyisocyanurate foam board; total thickness and LTTR-value shall be a minimum of 1.0" = 5.6; meeting Federal Specification No. HH-I-1972/1 or 2 with 20 psi minimum compressive strength and nominal 2.0 pcf density. Boards shall be surfaced on two (2) sides with non-asphaltic facer material.

2.10 CANT STRIP

A. Shall be treated solid wood meeting NRCA, FM Global and Underwriters Laboratory guidelines.

2.11 WOOD

A. All nailers, cants and wooden curbs shall be treated lumber as required by NRCA, FM Global and Underwriters Laboratory guidelines.

2.12 FASTENERS AND PLATES

A. General: All fasteners and plates for the installation of insulation, and for the installation of the membrane, shall be supplied and warranted by the membrane manufacturer for the specific application.

B. All fasteners and plates shall be FM Global approved corrosion resistant screws or anchors supplied and warranted by the membrane manufacturer. Fasteners shall be of a type and length recommended by the manufacturer for fastening the insulation and/or protection layer (through the existing roof in reroofing) to the structural roof deck.

2.13 FASTENERS

A. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide, and be as recommended by the fastener manufacturer for the specific application.

B. Fastener for Steel Deck/Metal Panels: Shall be a #14 fastener, fluorocarbon coated, with CR-10 coating. A minimum .200 diameter shank and .250 diameter thread. To be used with round pressure plates or bar, and having a fluorocarbon CR-10 coating, when subjected to thirty (30) Kesternich cycles (DIN 50018) shows less than ten percent (10%) red rust which surpasses FM Global Approval Standard 4470 as manufactured by Olympic Manufacturing Group, Inc., or approved equal. Fasteners, plates, and/or bars shall be listed in the FM Global Approval Guide.

C. Fastener for Purlin: Shall have a shank diameter of .168 and a thread diameter of .205. The purlin fastener will be used with a FM Global approved two inch (2") round steel barbed pressure plate, or approved equal.

2.14 MODIFIED BITUMEN COLD ADHESIVE

A. Shall be a fibrated rubberized adhesive specially formulated for horizontal applications of roofing plies, having the following minimum properties, as manufactured by Flex Membrane International, or approved equal.

Physical Properties	
Stormer viscosity @ 77° F	100-140 sec. (ASTM D-4479
Density @ 77°	7.9 –8.3 lbs./gal. (ASTM D-1475)
Solids by Weight	61-65% minimum (ASTM D-4479)
Flash Point	100° F minimum (ASTM D-3278)
Moisture by Weight	2.5% maximum (ASTM D-4479)
Mineral/Other stabilizers by wt.	15-18% (ASTM D-4479)
Asphalt by weight	45% (ASTM D-3019)
Lap Adhesion @ 24 hours cure	30 lbf/in. min. (ASTM D-3019)
Color	Black

Material shall be tested in accordance with ASTM D-3019, Type III and Dade County Compliance No. (95-0228).09

2.15 COLD APPLIED SUBSTRATE ADHESIVE

A. Shall have the following minimum properties, as manufactured by Flex Membrane International, or approved equal.

Property	Characteristics
Type	Rubber, asphalt, resin dispersion; Water vehicle
Color Dried Film	Black
Viscosity	Approximately 18,000 cps. (Brookfield at 77° F) Heavy paint consistency -- readily pourable
Solids, Wt. %	Approximately 75%
Application Procedure	Brush, squeegee or roller
Working Period	Remains tacky permitting wet or dry combining over wide range of conditions.
Application Limits (Temp.)	Between 50 and 100° F. However apply at near mid-temperature range whenever possible.
Service After Application	Not affected by extremes in atmospheric conditions. Maintains good bond over range minus 20° F to plus 200° F. Excellent water and moisture resistance.
Caution	Keep from freezing. Store above 40° F
Weight per Gallon Net	Approximately 8.4 lbs.
Container Sizes	5 gallon
Primer Use	When the product is used over cementitious surfaces, the surface must first be primed 24 hours before adhesive applications. The primer should be a solvent base asphalt cut back. The application rate is approximately 3/4 gallon per 100 square feet.

2.16 BONDING ADHESIVE FOR FLASHING

A. Description: Adhesive is a bonding cement of synthetic rubber for adhering membranes to various substrates, produced by Ashlund Chemical or approved equal.

Typical Liquid Properties (Room Temperature)		
Color	Amber/Yellow	
Base Product	Neoprene	
Solids	25%	
Specific Gravity	.87	
Pounds/Gallon	7.25	
Viscosity (CPS)	2500	
Solvents	Ketone, Toluene, Aliphatic Hydrocarbon, Zylene	
Estimated Coverage.	2 Sided Application	55/70 sq. ft. (2/2.5 mils dry)
DOT Label Required	Flammable Liquid	Code - 584661

B. Handling: Contains ingredients which could be harmful if mishandled. Contact with skin and eyes should be avoided and necessary protective equipment and clothing should be worn.

2.17 PITCH PAN SEALANT

A. Shall be one-part, self-leveling polyurethane sealant meeting Federal Specification No. TT-S-00230C, Type I, Class A, ASTM C 920, Type S, Grade P, Class 25, for use in new pitch pans, or approved equal.

2.18 ASPHALT ROOF PRIMER

A. To be used only where asphalt to asphalt products are employed; not for use on field membrane and cladded accessories. Shall be quick-dry asphalt-based primer for priming of asphalt roof surfaces or approved equal.

Applicable Federal Specification	SS-A-701B
ASTM	D 41
Flash Point	105° F
Viscosity at 80° F (ASTM D 217)	50-60 K.U.
Weight per gallon	7.4 pounds
Drying time (to touch)	Min. 4 hours

2.19 TRIM STRIP

A. The trim strip shall be six inch (6") wide non-reinforced 45 mil thermoplastic used for capping butted ends of rolls or approved equal. The trim strip shall be seamed with the use of hot-air welding.

2.20 T- JOINT COVERS

A. Supplied by the membrane manufacturer as a secondary covering to all T-joints in the installation of thermoplastic roof systems consisting of waterproofing coverings equal to or greater than 60 mils in thickness.

2.21 PIPE BANDS

A. Pipe bands shall be stainless steel bands with self-locking heads and shall be tightened with hand tool for tension control and flush cut off.

2.22 DELIVERY AND STORAGE

A. All materials shall be delivered with appropriate carton and can labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

2.23 PRECAUTIONS

A. Some of the indicated materials are extremely flammable and/or toxic. Use precautions indicated on can and carton labels.

2.24 MISCELLANEOUS MATERIALS

A. Other materials shall be as specified or of the best grade for the proposed use as recommended by the manufacturer.

PART 3 - EXECUTION

3.01 REFERENCE

A. The manufacturer's Technical Specifications shall be considered a part of this specification and should be referred to for more specific application procedures and recommendations.

B. Application of materials shall be in strict accordance with the manufacturer's recommendations except where more stringent requirements are shown or specified. In the instance of a conflict between these specifications and those of the manufacturer, the more stringent specifications shall take precedence.

C. General Installation:
1. Protect adjacent areas with tarpaulin or other durable materials.
2. Contractor shall prevent overspray and be responsible for parking lot areas and/or adjoining areas not part of this contract.
3. Contractor shall be responsible for sealing, as required, all openings that may allow bitumen migration or drippage, i.e. pitch dams, envelopes, and filler strips.
4. Prepare surfaces according to manufacturer's or applicator's published instructions. All metal that is to receive bitumen, or come in contact with bitumen or adhesive, shall be first primed with appropriate primer. Any prefinished sheet steel that is to receive bitumen, or come in contact with bitumen or adhesive, shall be scored, scuffed or abraded prior to receiving primer.
5. Use cleaning materials or primers necessary to render an acceptable surface/substrate.
6. All surfaces/substrates shall be clean and dry prior to application of materials.

7. Prior to application of felts and membrane, all foreign matter, gravel, etc., shall be removed from the insulation and/or substrate. Gravel or debris between the insulation/substrate and plies is not acceptable.
8. Ambient temperature shall be 45° F and rising.
9. Stir/Circulate bituminous materials.
10. Wrinkles, buckles, kinks, and fishmouths are not acceptable when laying membrane.
11. Where deteriorated base flashing is removed, primed cant strips shall be installed at the intersection of the deck and the vertical surfaces. All flashings shall be mechanically top-fastened with a termination bar a minimum of six inches (6") on center at the top leading edge, and be a minimum of eight inches (8") in height from finished membrane.
12. Provide a water test of each roof section prior to substantial completion. The test should simulate rainfall of one inch (1") per hour minimum.
13. On slopes greater than one inch (1") in twelve inches (12"), refer to NRCA and/or manufacturer's guidelines for backnailing procedures and follow the more stringent guidelines for all specified materials.

3.02 SUBSTRATE PREPARATION

A. Layover Existing: Remove all dust, dirt, and debris by use of enclosed vacuum. Substrate shall be smooth and free of debris, sharp edges, and other surface irregularities prior to work starting. **All rusted areas of the existing metal roof shall be treated with approved rust arresting paint applied in accordance with the manufacturer's instructions. Ensure that all fasteners are tight. Loose or missing fasteners shall be replaced with oversized fasteners.**

B. Metal Roof:
1. All loose rust, bitumen, or other foreign material shall be removed from the roof before commencing installation.
2. Deteriorated metal roofing shall be repaired or replaced as required and as recommended by the deck manufacturer on a unit cost basis as approved by the Owner's representative.
3. The metal roof shall be of like kind, quality, gauge and configuration. The roof span shall not exceed that recommended by a FM Global Bulletin 1-28.
4. If metal roof panel must be replaced:
   a) Erect metal roofing as recommended by the SDI. Properly align and level on structural supports.
   b) Allow minimum three inch (3") bearing when supported by structural steel and minimum six inch (6") bearing when supported by masonry.
   c) Care shall be exercised in the selection of electrodes and amperage to provide positive welds and to prevent blowholes.
   d) Weld metal shall penetrate all layers of roof material at end laps and side joints and shall have good fusion to the supporting members.
   e) Side lap fasteners shall be No. 12, self-drilling, self-tapping screws.
   f) Install closure strips and angle flashings as required to close openings between deck and walls, columns and openings.
   g) Immediately after installation, touchup welds, burned areas and damaged spots with prime paint.

3.03 NAILERS

A. Wooden nailers shall be installed at eaves, drip edges, expansion joints, and on outside perimeter of building according to NRCA, Underwriters Laboratory and IBC guidelines.

B. A layer of self-adhered membrane shall be placed between the existing metal roof and the new nailers. IN NO CIRCUMSTANCE SHALL THE WOOD NAILERS BE ALLOWED TO COME INTO DIRECT CONTACT WITH ANY METAL, WHETHER NEW OR EXISTING.

C. All Construction: Nailers shall be the same height as the new substrate board being installed where required. Nailers shall be raised if necessary, by anchoring an additional nailer of appropriate height to the existing nailer if the existing nailer is not to be replaced. Nailers shall be anchored to resist a pull-out force of one hundred seventy-five pounds (175#) per foot. Fasteners shall be no less than two (2) per nailer and be spaced at three feet (3') on center maximum. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish roof height.

3.04 WOOD CANTS

A. Toe of cant shall be level with the surface to receive new roof membrane and in all cases anchored according to NRCA, FM Global and Underwriters Laboratory guidelines.

3.05 APPLICATION OF FILLERS FOR FLUTES

A. Flutes of metal panels shall be filled with EPS board to match depth and configuration of flute prior to applying specified roofing components. Hot wire cut sections of specified EPS insulation to fit between the existing metal panel or standing seam metal panel rib configurations so as to minimize any gaps between the insulation and the metal roof panel. Prior to installation of the EPS fillers, the metal roof panels must be dry with all surface contaminants, mastics, dirt and debris removed. Substrate repair shall be performed as required to minimum of NRCA standards. If necessary, the EPS shall be tacked down with appropriate compatible adhesive to prevent any slipping or sliding of the EPS Filler.

3.06 INSULATION

A. Manufacturer's Instructions: In regard to attachment, the manufacturer's instructions or specifications shall determine the suitability for an application. Installation must meet ASCE 7 criteria and meet local governing building codes.

B. Precautions: The surface of the insulation must not be ruptured due to overdriving of fasteners.

C. Thermal insulation boards shall be laid on the substrate in parallel rows with end joints staggered and butted as close as possible. All joints shall be tight and at the roof perimeter and roof penetrations, insulation shall be cut neatly and fitted to reduce openings to a minimum. All openings one-fourth inch (1/4") or larger shall be filled with insulation.

D. No more insulation shall be installed than can be covered by the completed roof system by the end of the day or the onset of inclement weather.

3.07 LOOSE LAID INSULATION

A. Specified insulation shall be loose laid over the EPS Flute Fill. Boards shall be staggered and butted as close as possible with voids over one-fourth inch (1/4") to be filled.

B. Insulation shall be laid perpendicular to slope. The insulation layer must be fully supported by the EPS flute fill.

3.08 MECHANICALLY FASTENED COVER BOARD

A. Specified cover board shall be laid over the thermal insulation and mechanically fastened to conform to ASCE 7 criteria for wind uplift as dictated by wind zone applicable to location of project. Fasteners and fastening patterns shall be determined by building height, location and geographical area of the United States. It is the contractor's responsibility to consult current publications, literature, and bulletins of IBC and the manufacturer that are in effect at the time of this project. Boards shall be staggered and butted as close as possible with voids over one-fourth inch (1/4") to be filled.

B. Cover board shall be laid with long dimension edges parallel to slope and tightly butted. Cover board shall be mechanically fastened in to the purlins and existing metal panel as per ASCE 7 criteria for wind uplift as dictated by wind zone applicable to location of project and per the manufacturer’s requirements.

C. Fasteners must penetrate the purlin a minimum of one inch (1"). Using a screw gun with a minimum of 1800 RPM, drive the fastener through the purlin until a slight depression is seen around the plate. Caution should be taken not to overdrive the fastener causing stress plate surface to deflect more than one sixteenth inch (1/16").

3.09 COLD PROCESS APPLICATION OF BASE SHEET

A. Cover board shall be covered with SBS 80 mil SS base sheet adhered as follows:

All layers shall be applied using modified bitumen adhesive.by notched squeegee or spray equipment at the nominal rate of one and one-half to three (1.5 – 3) gallons per one hundred (100) square feet ± 20 percent. Sheets shall be lapped four inches (4")on the sides and six inches (6") on ends. Sufficient adhesive shall be applied at laps to result in a visible bead of adhesive at completed lap edge. End and side laps shall be rolled with a weighted roller immediately after installation. Specified layers shall be applied in accordance with the manufacturer's recommendations and in accordance with general practices as set forth by the NRCA Roofing Manual. NOTE: Base may not be left exposed more than five (5) days. NO EXPECTIONS.

3.10 COLD PROCESS APPLICATION OF FLEECE BACKED MEMBRANE

A. Adhered Application: Adhere membrane to acceptable substrate with substrate adhesive applied at the rate of one and one-half to three (1.5 – 3) gallons per one hundred (100) square feet ± 20 percent or as specified by the manufacturer.
   1. The roof surface must be clean, dry and free of foreign material.
   2. Position sheets as indicated on approved shop drawings. Membrane shall be applied shingle fashion, perpendicular to the slope of the roof deck.
   3. The membrane material shall be unrolled, cut into twelve feet to eighteen feet (12'-18') lengths, placed upside down and allowed to “relax” prior to installation. Then re-roll to apply.

4. Install full width sheets, lapping four inches (4") on the sides and six inches (6") on ends. Stagger adjacent end laps a minimum of eighteen inches (18") apart. Where installed over base sheet, stagger sheet's side and end laps from underlying plies.
5. Starting at the low point or the drains, apply the modified bitumen cold adhesive to the substrate in either method as follows:
   a. Pour the adhesive on the substrate and spread, using a serrated edged squeegee, applied at the rate of 1-1/2 gal per square.
   b. Spray, using equipment that will apply the adhesive at a rate equal to one and one-half (1-1/2) gallons per square.
6. Apply the adhesive so that the substrate is coated in a pattern slightly larger than the first sheet being applied.
7. Lap seams shall be done by lapping the selvedge edge over the non-selvedge edge of the previous roll four inches (4"). End laps and selvage laps of the membrane being lapped shall be coated with adhesive so that a visible bead of adhesive appears. Roll all laps with a steel roller to ensure proper adhesion.
8. LAP OPTION: The end laps and side laps may be hot-air welded. The hot-air welding method will provide a watertight lap immediately and is preferable when inclement weather is threatening.
9. Carefully push into place from fold line to overlap, avoiding wrinkles and air pockets. Roll or broom membrane flat.
10. Repeat procedure for other sheet half.
11. T-joint covers are required over all T-joints on installations of thermoplastic roofing membranes equal to or greater than 60 mils in thickness. Center T-joint cover over the T-joint and completely hot air weld the cover to the field membrane.

B. Welded Lap Seaming Procedure: Overlap membrane for attachment method specified and hot-air welded with manufacturer's approved equipment.
   1. All surfaces to be weld shall be clean, dry and free of foreign material.
   2. All seams must then be checked with a needle probe and any voids repaired with the heat gun.

3.11 FLASHING

A. Flash all penetrations, metal edge systems, walls, curbs, expansion joints, drains as shown on details and approved shop drawings with white reinforced Elvaloy® flashing membrane.
   1. Mechanically fasten flashing at terminations according to approved details.
   2. Fastening membrane flashing through metal counterflashing is not acceptable.

B. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.12 WOOD NAILERS

A. Locate and install as shown on details, along gravel stops and drip edges and other areas as required by membrane manufacturer.

B. Anchor nailer to structural deck with manufacturer's approved fasteners, spaced appropriately for the specified installation; minimum withdrawal resistance: one hundred (100) pounds.

C. Height and Taper: Match top of adjacent construction within one-fourth inch (1/4"). Taper as required to provide continuous contact surface without creating ponding.

3.13 CLEANING

A. Clean exposed surfaces of excess cement, adhesive, sealants, mortar and paint associated with the new work.

B. Clean work area of excess roofing materials and installation debris daily.

C. Repair or replace defaced or disfigured finishes caused by the work.

3.14 PROTECTION

A. Protect all building surfaces against damage from roofing work.

B. Where traffic must continue over finished, installed roofing system, protect membrane, underlayment accessories and finishes from damage.

3.15 MEMBRANE PROTECTION

A. Where equipment pads, wood sleepers, or walkway slabs are to be installed over the roofing membrane, an additional layer of the roofing membrane shall be installed between the roofing membrane and the pad, sleeper, or slab. Due caution shall be exercised to prevent roofing membrane damage during placement. Where required, membrane shall be welded to field membrane to prevent slippage.

3.16 PIPING/CONDUIT

A. Piping/conduit shall be raised to NRCA recommended heights, and new supports furnished. Permanent supports shall be installed upon pads approved by membrane manufacturer. Coordinate work with Owner's representative.

3.17 PIPE/EQUIPMENT SUPPORTS

A. Designated pipe/equipment supports shall be removed and replaced with new specified pipe supports. Pipe supports shall be placed approximately ten feet (10') on center. New blocks shall be set on a double layer of membrane, and attached to the pipe with suitable strapping. Double layer of membrane shall be adhered to the roof surface.

B. Gas lines three inches (3") and over must be supported on wood block with pipe roll stands.

3.18 OVERNIGHT SEAL

A. Shall be performed according to accepted roofing practice as outlined in the NRCA Roofing Manual, SPRI and membrane manufacturer's recommended procedure.

B. The roofing membrane shall be sealed to the roof deck or existing roof at the end of the day or at the onset of inclement weather to prevent water from flowing into the completed roofing system. Temporary seals shall be removed upon resumption of work.

3.19 MEMBRAN CLEANING

A. After all membrane has been installed, it shall be cleaned with a cleaning agent compatible with the membrane to return the membrane to like new appearance.

END OF SECTION 07 54 19

SECTION 07 54 20
ADHERED MULTI-PLY ROOF SYSTEM

PART 1 - GENERAL

1.01 AREAS COVERED

A. Low slope roof areas as indicated on plans at Clover Elementary School and Buell Central High School.

1.02 INSTALLER QUALIFICATIONS

A. Roofing Installer must be:
1. Currently prequalified with the Owner in accordance with Owner's prequalification requirements.
2. Currently in good standing with the manufacturer.

B. It shall remain each Contractor's responsibility to determine his current status with the manufacturer's certification plan.

1.03 QUALITY ASSURANCE

A. Applicator/Installer:
1. Acceptable to roof material manufacturer for the manufacturer's warranty requirements.
2. Five (5) years successful experience on projects similar in size and scope.
3. Experienced in the type of roofing work required.
4. Successfully completed previous projects warranted by the manufacturer.

B. Manufacturer Qualifications:
1. A qualified manufacturer that has been UL Listed and has FM Approvals for membrane roofing system similar to that used in this project for a minimum of fifteen (15) years.

C. Manufacturer’s Observation Reports: Beginning with the commencement of the roofing system installation for the project and continuing through the completion of the roofing system installation and all its associated components, the Roofing System Manufacturer or their appointed representative shall provide weekly jobsite observations and written observation reports including digital photos as follows and this shall be confirmed in writing by the manufacturer and made part of the roofing submittals.

1. Keep the Architect / Owner informed as to the progress, status, and quality of work as observed.
2. Provide weekly jobsite observations no less than (2) hours per week throughout the installation of the roofing system and its associated components. Reports shall include detailed weekly reports to the Architect, Contractor, and Subcontractor along with digital photographs of work in progress. These reports and photographs shall be descriptive of actual work in progress, status, and condition, and be presented in a written format with digital color photographs.
3. Report to the Architect / Owner in writing any refusal or failure of the Contractor to correct installations, practices and/or conditions in conflict with the specifications and/or manufacturer’s recommended guidelines called to the Contractor’s attention.
4. It will be the sole responsibility of each bidder to ensure these conditions are to be met by the roofing system manufacturer and/or their appointed representative prior to bidding.

D. Testing Laboratory Services: Test results shall meet or exceed established standards.

E. Underwriters Laboratories, Inc.; Roofing Covering: Class A fire hazard classification.

F. Comply with governing local, state, and federal regulations, safety standards, and codes.

1.04 REFERENCES (INCLUDING LATEST REVISIONS)

A. American Society for Testing and Materials:

1.	ASTM B 209	Specification for Aluminum and Aluminum Alloy Sheet and Plate
2.	ASTM C 719	Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cycle Movement (Hockman Cycle)
3.	ASTM C 794	Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
4.	ASTM C 920	Specification for Elastomeric Joint Sealants
5.	ASTM D 312	Specification for Asphalt Used in Roofing
6.	ASTM D 1863	Specification for Mineral Aggregate Used on Built-up Roofs
7.	ASTM D 2178	Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
8.	ASTM D 2824	Specification for Aluminum - Pigmented Asphalt Roof Coatings
9.	ASTM D 4586	Specification for Asphalt Roof Cement, Asbestos Free
10.	ASTM A 361	Sheet Steel, Zinc-Coated (Galv.) by the Hot-Dip Process for Roofing and Siding
11.	ASTM C 177	Test for Thermal Laboratory Services
12.	ASTM C 728	Perlite Thermal Insulation Board

B. Federal Specifications:
1. LLL-I-535B
2. SS-A-701B
3. SS-C-153
4. SS-C-153C
5. SS-R-620B
6. TT-C-498C
7. TT-P-320D
8. TT-S-00227E
9. TT-S-00230C
10. SS-S-001534 (GSA-FSS)
11. L-P-375

C. Industry Standards:
1. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual
2. Single-ply Roofing Institute (SPRI) - A Professional Guide to Specifications Manual
3. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual
4. American Society of Civil Engineers – ASCE 7

1.05 SUBMITTALS

A. Samples and Manufacturer's Submittals: Submit prior to delivery or installation.
1. Samples of all roofing system components including all specified accessories.
2. Submit samples of proposed warranty complete with any addenda necessary to meet the warranty requirements as specified.
3. Submit latest edition of manufacturer's specifications and installation procedures. Submit only those items applicable to this project.
4. A written statement from the roofing materials manufacturer approving the installer, specifications and drawings as described and/or shown for this project and stating the intent to

guarantee the completed project.

5. Manufacturer's Equiviscous Temperatures (EVT) for the specified bitumens.

B. Shop Drawings: Provide manufacturer's approved details of all perimeter conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings. Shop drawings shall be engineered drawings, digital or CAD. Hand sketches, copies or tracings of projects documents are not acceptable. Manufacturer’s details are acceptable provided they are job specific and representative of actual conditions.

C. Maintenance Procedures: Within ten days of the date of Substantial Completion of the project, deliver to the Owner three copies of the manufacturer's printed instructions regarding care and maintenance of the roof.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

B. Deliver materials requiring fire resistance classification to the job with labels attached and packaged as required by labeling service.

C. Deliver materials in sufficient quantity to allow continuity of work.

D. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers.

E. Handle rolled goods so as to prevent damage to edge or ends.

F. Select and operate material handling equipment so as not to damage existing construction or applied roofing.

G. Moisture-sensitive products shall be maintained in dry storage areas and properly covered. Provide continuous protection of materials against wetting and moisture absorption. Store roofing and flashing materials on clean raised platforms with weather protective covering when stored outdoors.

H. Store rolled goods on end.

I. Protect materials against damage by construction traffic.

J. The proper storage of materials is the sole responsibility of the contractor and any wet or damaged roofing materials shall be discarded, removed from the project site, and replaced prior to application.

K. Comply with fire and safety regulations, especially with materials which are extremely flammable and/or toxic. Use safety precautions indicated on labels.

L. Products liable, such as emulsions, to degrade as a result of being frozen shall be maintained above 40° F in heated storage.

M. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day.

1.07 SITE CONDITIONS

A. Job Condition Requirements:
1. Apply roofing in dry weather.
2. Do not apply roofing when ambient temperature is below 45° F.
3. Coordinate the work of the contractor with the work to be performed by the Owner's personnel, to ensure proper sequencing of the entire work. The Owner's personnel will be erecting interior protection for equipment, if required. The contractor is to schedule his work so that adequate time is allowed for the Owner's personnel to perform the work. No roof work shall be performed until the Owner's personnel have completed erection of the interior protection in that area.
4. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with specifications.
5. Schedule the work so the building will be left watertight at the end of each day. Do not remove more roofing material than can be reinstalled in any working day.
6. All surfaces to receive new roofing shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Owner. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.
7. The contractor shall take all necessary precautions to protect the roof mat and deck from damage. The contractor shall be responsible for repairing all new areas of damage caused by the negligence of the contractor, at the contractor's expense. The Owner's on-site representative shall determine damage caused by contractor negligence.
8. The contractor shall follow local, state, and federal regulations, safety standards, and codes for the removal, handling, and disposal of asbestos containing materials, if present. When a conflict exists, use the stricter document.
9. Follow insurance underwriter's requirements acceptable for use with specified products or systems.
10. Due caution should be exercised so as not to alter the structural integrity of the deck. When cutting through any deck, care should be taken so as not to damage the deck or any part of the deck, such as post tension cables, etc.
11. All kettles shall have an automatic thermostat control, and temperature gauge, all in working order.
12. The contractor is to verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. The contractor is to perform all work in such a manner as to avoid contact with the above-mentioned items.
13. Surface and air temperatures should be a minimum 45° F during applications of cleaner and waterproof coating and remain above 45° F for a minimum of four (4) hours following applications. Verify compatibility of cleaner with coatings, paints, primers and joint sealers specified. Advise Owner's representative of any problems in this regard prior to commencing cleaning operations.
14. Temporary Sanitary Facilities: The contractor shall furnish and maintain temporary sanitary facilities for employees use during this project. These will be removed after the completion of the project. All portable facilities shall comply with local laws, codes, and regulations.

B. Protection of Work and Property:
   1. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations pertaining to asbestos as required shall be fulfilled by the contractor as part of his proposal.
   2. Property: Protect existing planting and landscaping as necessary or required to provide and maintain clearance and access to the work of this contract. Examples of two categories or degrees of protection are generally as follows: a) removal, protection, preservation, or replacement and replanting of plant materials; b) protection of plant materials in place, and replacement of any damage resulting from the contractor's operations.
   3. Twenty-four Hour Call: The contractor shall have personnel on call 24 hours per day, seven (7) days per week for emergencies during the course of a job. The Owner's Project Manager is to have the 24 hour numbers for the contact. Contractor must be able to respond to any emergency call and have personnel on-site within two (2) hours after contact. Numbers available to the Owner's Project Manager are to be both home and office numbers for:
      a) Job Foreman
      b) Job Superintendent
      c) Owner or Company Officer

C. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds must be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.

D. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.

E. Use of Premises:
   1. The contractor is advised that the Owner will occupy the building at all times, and the contractor must provide all safeguards required to protect personnel and to keep noise levels as low as reasonably possible for each operation.
   2. The contractor shall:
      a) Coordinate work in such a manner as to not interfere with the normal operation of the building.
      b) Assume full responsibility for protection and safekeeping of products stored on premises.
      c) Agree to hold the Owner harmless in any and all liability of every nature and description which may be suffered through bodily injuries, including death of any persons by reason of negligence of the contractor, agents, employees, or subcontractors.

F. Cleaning and Disposal of Materials:
   1. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.

2. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. A suitable scrap chute or hoist must be used to lower any debris. At completion, all work areas shall be left broom clean and all contractor's equipment and materials removed from the site.
3. All bituminous or roofing related materials shall be removed from ladders, stairs, railings, and similar parts of the building.
4. Debris shall be deposited at an approved disposal site.

1.08 WARRANTY

A. Twenty (20) Year NDL Total System Warranty: The complete roofing system shall be guaranteed for a minimum of twenty (20) years from the date of Substantial Completion for this project. Guarantee responsibilities shall be as follows:
1. Roofing contractor shall guarantee the entire roofing system for a period of two (2) years from the date of Substantial Completion.
2. The materials manufacturer shall guarantee the entire roofing system as supplied by system manufacturer for a total period of twenty (20) years from the date of substantial completion.
3. Membrane manufacturer shall provide the written warranty as specified.
4. The entire roofing system shall be guaranteed to be watertight and against any failures of workmanship and materials. Repair of the system, including materials and labor, shall be done at no cost to the Owner.
5. Warranty repairs shall be performed by a certified installer. The repairs shall be performed in accordance with the manufacturer's written instructions and recommended procedures so as to not void the warranty.

B. During the proposal period each Contractor shall make arrangements with the materials manufacturer to provide the required warranty. Refer to Submittals Paragraph for requirements concerning submittals of warranty.

PART 2 - PRODUCTS

2.01 GENERAL

A. Compatibility: Provide materials that are recommended by manufacturers to be fully compatible with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.

B. Materials herein specified shall be supplied or approved in writing by the manufacturer issuing the warranty.

C. The white polyester reinforced fleece backed adhered PVC with Elvaloy® roofing system shall only be applied by manufacturer approved and trained roofing contractors.

D. The manufacturer shall have 15 years UL listing for the membrane to be used on the project. Membrane manufacturer shall have a minimum of 15 years FM approval, and 15 years manufacturing experience with the roofing membrane specified for this project.

E. All roofing and roof accessories shall be installed in compliance with manufacturer's current specifications and details.

F. All materials used on the project shall be asbestos free.

2.02 ROOFING MEMBRANE

A. The white 60 mil polyester reinforced fleece backed PVC with Elvaloy® membrane shall have the following minimum physical properties:

Property	Test Procedure	Physical Properties
Color	ASTM D 751	White
Thickness	ASTM D 751	60 mil (.060")
Thickness over Scrim	ASTM D 7635	.030"
Polyester Fleece Backing		5.5 oz.
Reinforcement Scrim		Polyester
Solar Reflectance Index (SRI)	ASTM E 1980	109

B. Basis of Design: Flex FB 60 Elvaloy® KEE Roof Membrane as manufactured by Flex Membrane International.

C. Approved Manufacturer's and Membranes:

1. Flex Membrane International Corp. / Flex FB 60 Elvaloy® KEE Roof Membrane
2. The Garland Company / KEE- Stone® FB 60 mil
3. Tremco Roofing & Waterproofing / TPA FB 60 mil Roof Membrane

2.03 FLASHING MEMBRANE

A. The flashing membrane shall be a white Elvaloy® polyester reinforced flexible sheet shall have the following minimum physical properties:

Property	Test Procedure	Physical Properties
Color	ASTM D 751	White
Thickness	ASTM D 751	60 mil (.060")
Thickness over Scrim	ASTM D 7635	.031"
Reinforcement Scrim		Polyester
Solar Reflectance Index (SRI)	ASTM E 1980	109

B. Basis of Design: Flex MF/R 60 Elvaloy® KEE Roof Membrane as manufactured by Flex Membrane International.

C. Approved Manufacturer's and Membranes:
1. Flex Membrane International Corp. / Flex MF/R 60 Elvaloy® KEE Roof Membrane
2. The Garland Company / KEE-Stone 60 mil
3. Tremco Roofing & Waterproofing / TPA Flashing Membrane 60 mil

2.04 NON-REINFORCED MEMBRANE

A. The non-reinforced membrane shall have the following minimum properties, or approved equal.
1. Description: Non-reinforced thermoplastic white membrane, thickness approximately 45 mils.
2. Use: Inside/outside corners, multiangled intersections, sealant pockets and other conditions where molding of the membrane is required.

2.05 CAULKS

A. Sealant for use at coping joints, reglet joints, etc., shall be a one-component urethane non-sag, gun grade sealant designed for use in active exterior joints, and shall meet or exceed Federal Specification No. 1 TT-S-00230C, Type II, Class A, ASTM C 920. Where joint surfaces are contained or are contaminated with bituminous materials, provide manufacturer's modified-type sealant (modified with coal-tar or asphalt as required), or approved equal.

B. To seal the leading edge of the membrane, to bond membrane at terminations with metal, and for open seam repair, sealant shall be a thermosetting, solvent free, non-slump, self-fixturing, multipurpose structural sealant which shall meet the following physical and performance properties, M-1 as manufactured by Chem Link Inc., or approved equal.

Properties	
Specific Gravity	1.62 (13.5 lbs./gallon)
Viscosity	800,000 cps Brookfield RTV, TF spindle, 4 rpm 70° F.
Shear Strength (ASTM D-1002)	300 psi+ (7 day ambient cure)
Elongation @ break (ASTM D-412)	300% (7 day ambient cure)
Hardness Shore A (ASTM C-661)	50 – 55 (14 day ambient cure)
Tack free time (ASTM C-679)	35 minutes
Low temperature flex	Minus 20° F: PASS
Slump (sag) (ASTM C-639)	Zero slump
Shrinkage (ASTM D-2453)	No measurable shrinkage (14 cay cure)
Service temperature	-40° F to 200°

C. Polyether sealant: The joint sealant shall be a 100% solid, one-component, gun grade, non-sag, polyether-base material. It shall be applicable for use at Kynar 500 coated metal, in, vertical, and overhead joints. The sealant shall cure under the influence of atmospheric moisture to form an elastomeric joint material. Materials shall comply to: ASTM C920, Type S, Grade NS, Class 50, Use T2, NT, M, A, G, and O; Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N, No. 81026; DuraLink as manufactured by Chem Link, Inc., or approved equal.

Properties	Results	Test Methods
Tensile strength, psi	250-300	ASTM D412
Peal strength, psi	25-30	ASTM C794
Elongation at break, %	750-800	ASTM D412
Hardness, Shore A	17-23	ASTM C661
Lap shear Strength, psi	150-175	ASTM D1002
Low temp. flexibility	Pass-10°F (-23°C) 1/4inch mandrel	ASTM D816
Service Temperature	-40°F to 200°F (-40°C to 93°C)	

2.06 SHEATHING PAPER

A. For use as barrier layer between the wood deck and base ply/insulation; shall be rosin-sized sheathing paper.

2.07 BASE SHEET

A. Shall be Underwriters Laboratory approved and listed in the FM Global Approval Guide.

B. Shall be A Styrene Butadiene Styrene (SBS) 80 mils thick, smooth surfaced modified bitumen base sheet, tested in accordance with ASTM D 5147, as approved by field membrane manufacturer.

C. Basis of Design: Flex SBS 80 mil S/S Base Sheet Roof Membrane as manufactured by Flex Membrane International.

D. Approved Manufacturer's and Membranes:
1. Flex Membrane International Corp. / Flex SBS 80 Mil S/S Base Sheet
2. The Garland Company / Stress Base
3. Tremco Roofing & Waterproofing / POWERply Standard Smooth

2.08 INSULATION

A. All insulation shall be approved in writing by the membrane manufacturer as to thickness, type, and manufacturer. All insulation must be approved for the specific application, Underwriters Laboratory approved, and be listed in the FM Global Approval Guide.

B. Polyisocyanurate Roof Insulation: Insulation shall be a minimum of two (2) layers of rigid polyisocyanurate foam board; LTTR-value shall be a minimum of 25.0; meeting Federal Specification No. HH-I-1972/1 or 2 with 20 psi minimum compressive strength and 2.0 pcf minimum density. Board shall be surfaced on two (2) sides with non-asphaltic facer material. No layer shall be less than 1.5" or greater than 2.7" thick.

C. Tapered Polyisocyanurate Roof Insulation: At structurally flat roof areas (Clover roof areas B, C, & L; Buell roof areas B & C), provide tapered polyisocyanurate insulation board per Federal Specification No. HH-I-1972/1 or 2, with a 20 psi minimum compressive strength and 2.0 pcf density minimum. Insulation shall be of thickness required for one-fourth inch (1/4") slope per foot to roof drains as shown on drawings. Insulation shall be surfaced on two (2) sides with a non-asphaltic facer material.

D. Tapered Polyisocyanurate Roof Insulation Crickets: Shall be tapered polyisocyanurate board per Federal Specification No. HH-I-1972/1 or 2, with a 20 psi minimum compressive strength and 2.0 pcf density minimum. Insulation shall be of thickness required for one-half inch (1/2") slope per foot to roof drains as shown on drawings. Insulation shall be surfaced on two (2) sides with a non-asphaltic facer material.

E. Cover Board: Impact-resistant, nonstructural, specially engineered gypsum and cellulose fiber panels with 95% recycled content; uniform water-resistance throughout core and surface. Board size four feet by eight feet (4' x 8'), thickness 1/2"; conforming to ASTM C 1278, meeting FM 4470 Class 1 criteria, classified by Underwriters Laboratory, and listed in the FM Global Approval Guide. Board will meet the following physical properties, Securock™ Roof Board, as manufactured by USG Corporation, or approved equal.

Test	Typical Value	Test Method
Fire Resistance	Class A	UL 790
Permeance	≤ 30	ASTM C473
Surface water absorption	≤ 1.6 nominal grams	ASTM C473
Water resistance	Maximum 10% weight percentage gain	
Mold Resistance	Minimum rating of "10"	ASTM D3273

2.09 FASTENERS AND PLATES

A. General: All fasteners and plates for the installation of insulation, and for the installation of the membrane, shall be supplied and warranted by the membrane manufacturer for the specific application.

B. All fasteners and plates shall be FM Global approved corrosion resistant screws or anchors supplied and warranted by the membrane manufacturer. Fasteners shall be of a type and length recommended by the manufacturer for fastening the insulation and/or protection layer (through the existing roof in reroofing) to the structural roof deck.

2.10 FASTENERS

A. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide, and be as recommended by the fastener manufacturer for the specific application.

B. Fastener for Brick: Shall be one-fourth inch by two inches (1/4" x 2"), zinc with plated steel or stainless steel nail, one piece unit, flat head, as manufactured by Rawl Zamac Nailin, or approved equal.

C. Fastener for Wood / Steel Deck: Shall be a #14 fastener, fluorocarbon coated, with CR-10 coating. A minimum .200 diameter shank and .250 diameter thread. To be used with round pressure plates or bar, and having a fluorocarbon CR-10 coating, when subjected to thirty (30) Kesternich cycles (DIN 50018) shows less than ten percent (10%) red rust which surpasses FM Global Approval Standard 4470, as manufactured by Olympic Manufacturing Group, Inc., or approved equal. Fasteners, plates, and/or bars shall be listed in the FM Global Approval Guide.

2.11 COLD APPLIED SUBSTRATE ADHESIVE

A. Shall have the following minimum properties, as manufactured by Flex Membrane International, or approved equal.

Property	Characteristics
Type	Rubber, asphalt, resin dispersion; Water vehicle
Color Dried Film	Black
Viscosity	Approximately 18,000 cps. (Brookfield at 77° F) Heavy paint consistency -- readily pourable
Solids, Wt. %	Approximately 75%
Application Procedure	Brush, squeegee or roller
Working Period	Remains tacky permitting wet or dry combining over wide range of conditions.
Application Limits (Temp.)	Between 50 and 100° F. However apply at near mid-temperature range whenever possible.
Service After Application	Not affected by extremes in atmospheric conditions. Maintains good bond over range minus 20° F to plus 200° F. Excellent water and moisture resistance.
Caution	Keep from freezing. Store above 40° F
Weight per Gallon Net	Approximately 8.4 lbs.
Container Sizes	5 gallon
Primer Use	When the product is used over cementitious surfaces, the surface must first be primed 24 hours before adhesive applications. The primer should be a solvent base asphalt cut back. The application rate is approximately 3/4 gallon per 100 square feet.

2.12 BONDING ADHESIVE FOR FLASHING

A. Description: Adhesive is a bonding cement of synthetic rubber for fully adhering membranes to various substrates, produced by Ashland Chemical, or approved equal.

Typical Liquid Properties (Room Temperature)	
Color	Amber/Yellow
Base Product	Neoprene
Solids	25%
Specific Gravity	.87
Pounds/Gallon	7.25
Viscosity (CPS)	2500
Solvents	Ketone, Toluene, Aliphatic Hydrocarbon, Zylene
Estimated Coverage	
2 Sided Application	55/70 sq. ft. (2/2.5 mils dry)
DOT Label Required	Flammable Liquid
Code - 584661	

B. Handling: Contains ingredients which could be harmful if mishandled. Contact with skin and eyes should be avoided and necessary protective equipment and clothing should be worn.

2.13 ASPHALT ROOF PRIMER

A. To be used only where asphalt to asphalt products are employed; not for use on field membrane and cladded accessories. Shall be quick-dry asphalt-based primer for priming of asphalt roof surfaces or approved equal.

Applicable Federal Specification	SS-A-701B
ASTM	D 41
Flash Point	105° F
Viscosity at 80° F (ASTM D 217)	50-60 K.U.
Weight per gallon	7.4 pounds
Drying time (to touch)	Min. 4 hours

2.14 CANT STRIP

A. Shall be wood fiber where used for non-structural purposes. Shall be treated solid wood where used for structural purposes meeting NRCA, FM Global and Underwriters Laboratory guidelines. If solid wood cant is used where insulation exists, cant is to be toe nailed into treated solid wood nailer the same height as insulation.

2.15 WOOD

A. All nailers, cants and wooden curbs shall be fire rated, treated lumber as required by NRCA, FM Global and Underwriters Laboratory guidelines.

2.16 TRIM STRIP

A. The trim strip shall be six inch (6") wide non-reinforced 45 mil thermoplastic used for capping butted ends of rolls or approved equal. The trim strip shall be seamed with the use of hot-air welding.

2.17 PIPE BANDS

A. Stainless steel bands with self-locking heads.

B. Tighten with hand tool for tension control and flush cut off.

2.18 PITCH PAN SEALANT

A. Shall be one-part, self-leveling polyurethane sealant meeting Federal Specification No. TT-S-00230C, Type I, Class A, ASTM C 920, Type S, Grade P, Class 25, for use in new pitch pans, as manufactured by Flex Membrane International, or approved equal.

2.19 PIPESTANDS (6" OR SMALLER - LESS THAN 9" OFF ROOF SURFACE)

A. Black, polycarbonate construction with stainless steel roller pin assembly suitable for gas lines and conduit set in finished roof assemblies, Model No. 24R, sized accordingly, as manufactured by Miro Industries, Inc.

2.20 LEAD FLASHING DRAINS

A. Shall be four-pound (4#) lead, minimum thirty-six inches by thirty-six inches (36" x 36"), used for flashing of internal drains.

2.21 WALKWAY PAD

A. The walkway pad shall have the following minimum physical properties, and be applied with edges heat or solvent welded, as manufactured by Flex Membrane International, or approved equal.

Property	Test Procedure	Physical Properties
Color		Gray
Size		36" wide x 60' long
Thickness	ASTM D 638	.080" nominal
Reinforcement		1000 Denier Polyester
Tear Strength	ASTM D 751	210 X 200 lbf
Puncture Resistance		96 lbs
Cold Resistance	ASTM D 1043	-40° C
Shore A Durometer		85
Hydrostatic Resistance		400 psi
Dimensional Stability	ASTM D 1240	≤ 1%
Ultraviolet Stability		12,000 hrs. Excellent

2.22 TERMINATION/PRESSURE BARS

A. Aluminum strip shall be extruded channel bar with a mill finish, width one inch (1"), thickness 0.100" ± .008", leg height one-fourth inch (1/4") top and bottom, leg angle ninety degrees (90°), for perimeter and curb anchorage, having predrilled holes six inches (6") on center, as manufactured by Olympic Fasteners, or approved equal.

2.23 T- JOINT COVERS

A. Supplied by the membrane manufacturer as a secondary covering to all T – Joints in the installation of thermoplastic roof systems consisting of waterproofing coverings equal to or greater than 60 mils in thickness.

2.24 ROOF HATCH

A. Shall be pre-manufactured hatch, as manufactured by Bilco Company, or approved equal. Size shall be match existing opening.

1. Material: Aluminum with 11-gauge cover and frame.
2. Cover: Break-formed, hollow-metal design with three inch (3") concealed fiberglass insulation, three inch (3") beaded, overlapping flange, fully welded at corners, and internally reinforced for 40 psf live load.
3. Curb: Sixteen inches (16") in height with integral cap flashing. One inch (1") fiberboard insulation, fully welded at corners, and three and one-half inches (3-1/2") mounting flange with seven-sixteenths inch (7/16") holes provided for securing frame to the roof deck.
4. Gasket: Extruded EPDM rubber gasketed permanently adhered to cover.
5. Hinges: Heavy-duty pintle hinges with three-eighths inch (3/8") Type 316 stainless steel hinge pins.
6. Latch: Slam hatch with interior and exterior turn handles and padlock hasps.
7. Lift Assistance: Compression spring operators enclosed in telescopic tubes with automatic hold-open arm with grip handle release.
8. Finish: Aluminum with mill finish, or as selected by Project Manager/Architect.
9. Hardware: Aluminum with engineered compression spring tubes. Steel compression springs with electrocoated acrylic finish and Type 316 stainless steel hinges. All other hardware is zinc plated/chromate sealed.
10. Roof hatch must have a minimum R-value of 12.
11. Roof hatch shall be equipped with a “Ladder-Up” retractable safety post.

2.25 VERTICAL WALL SHIMMING MATERIAL

A. Shall be one of the following unless otherwise accepted by Owner's representative: OSB, exterior grade plywood, gypsum core board or concrete core board. Proper selection of material is required to achieve FM Global and UL guidelines.

2.26 SELF-ADHERING UNDERLAYMENT FOR TEMPORARY WATERPROOFING

A. A premium heavyweight, minimum 60 mil, self-adhering underlayment, to use as a temporary waterproofing barrier and overnight seal.

2.27 DELIVERY AND STORAGE

A. All materials shall be delivered with appropriate carton and can labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

2.28 PRECAUTIONS

A. Some of the indicated materials are extremely flammable and/or toxic. Use precautions indicated on can and carton labels.

2.29 MISCELLANEOUS MATERIALS

A. Other materials shall be as specified or of the best grade for the proposed use as recommended by the manufacturer.

PART 3 - EXECUTION

3.01 REFERENCE

A. The manufacturer's Technical Specifications shall be considered a part of this specification and should be referred to for more specific application procedures and recommendations.

B. Application of materials shall be in strict accordance with the manufacturer's recommendations except where more stringent requirements are shown or specified. In the instance of a conflict between these specifications and those of the manufacturer, the more stringent specifications shall take precedence.

C. General Installation:
1. Protect adjacent areas with tarpaulin or other durable materials.
2. Contractor shall prevent overspray and be responsible for parking lot areas and/or adjoining areas not part of this contract.
3. Contractor shall be responsible for sealing, as required, all openings that may allow bitumen migration or drippage, i.e. pitch dams, envelopes, and filler strips.
4. Prepare surfaces according to manufacturer's or applicator's published instructions. All metal that is to receive bitumen, or come in contact with bitumen or adhesive, shall be first primed with appropriate primer. Any prefinished sheet steel that is to receive bitumen, or come in contact with bitumen or adhesive, shall be scored, scuffed or abraded prior to receiving primer.
5. Use cleaning materials or primers necessary to render an acceptable surface/substrate.
6. All surfaces/substrates shall be clean and dry prior to application of materials.
7. Prior to application of felts and membrane, all foreign matter, gravel, etc., shall be removed from the insulation and/or substrate. Gravel or debris between the insulation/substrate and plies is not acceptable.
8. Ambient temperature shall be 45° F and rising.
9. Stir/Circulate bituminous materials.
10. Wrinkles, buckles, kinks, and fishmouths are not acceptable when laying membrane.
11. Where deteriorated base flashing is removed, primed cant strips shall be installed at the intersection of the deck and the vertical surfaces. All flashings shall be mechanically top-fastened with a termination bar a minimum of six inches (6") on center at the top leading edge, and be a minimum of eight inches (8") in height from finished membrane.
12. Provide a water test of each roof section prior to substantial completion. The test should simulate rainfall of one inch (1") per hour minimum.
13. On slopes greater than one inch (1") in twelve inches (12"), refer to NRCA and/or manufacturer's guidelines for backnailing procedures and follow the more stringent guidelines for all specified materials.

3.02 SUBSTRATE PREPARATION

A. Tear-off: Remove all built-up roofing, flashing, insulation, and sheet metal down to the roof deck or original substrate. Substrate shall be smooth, free of debris, sharp edges, and other surface irregularities prior to starting roofing application. Substrate repair shall be performed as required to minimum of NRCA standards.

B. Metal Decks - Reroof:
1. All loose rust, bitumen, or other foreign material shall be removed from the deck before applying asphalt primer at the minimal rate of one and one-half (1-1/2) gallons per one hundred (100) square feet of area.
2. Deteriorated metal decking shall be repaired or replaced as required and as recommended by the deck manufacturer on a unit cost basis as approved by the Owner's representative.

3. The metal deck shall be of like kind, quality, gauge and configuration. The deck span shall not exceed that recommended by FM Global Bulletin 1-28.
4. If metal deck must be replaced:
   a) Erect metal decking as recommended by the SDI. Properly align and level on structural supports.
   b) Allow minimum three inch (3") bearing when supported by structural steel and minimum six inch (6") bearing when supported by masonry.
   c) Care shall be exercised in the selection of electrodes and amperage to provide positive welds and to prevent blowholes.
   d) Weld metal shall penetrate all layers of deck material at end laps and side joints and shall have good fusion to the supporting members.
   e) Side lap fasteners shall be No. 12, self-drilling, self-tapping screws.
   f) Install closure strips and angle flashings as required to close openings between deck and walls, columns and openings.
   g) Immediately after installation, touchup welds, burned areas and damaged spots with prime paint.
   h) Expansion/control joints shall be installed so that no one area exceeds two hundred feet by two hundred feet (200' x 200').

C. Above-Deck Fills:
1. Roofing substrate must be acceptable to the manufacturer prior to application of roof materials.
2. Fill shall be patched with quick setting cement as required to provide a smooth substrate for installation.

D. Wood Decks:
1. Cracks wider than one-fourth inch (1/4"), or any opening of more than one-half inch (1/2"), shall be covered with securely nailed sheet metal.
2. Care should be exercised so that the deck is not damaged when removing the existing roof.
3. Any decking which is damaged, wet, or rotted must be replaced with exterior grade wood of similar type and size. All boards shall be securely nailed to the supporting members.
4. Dry rosin-sized sheathing paper shall be tacked into place over the deck to prevent asphalt from dripping into the building.
5. Plywood/wood plank decks shall be of exterior grade and securely nailed to supporting members. The plywood shall be a minimum of one-half inch (1/2") in thickness.

3.03 CATEGORY II (NON-FRIABLE) ASBESTOS CONTAINING MATERIALS (ACM) REMOVAL

A. Owner and Contractor agree to exonerate, indemnify, defend, and hold harmless the roofing material manufacturer from and against all claims, demands, lawsuits, damages, expenses and losses incurred by Contractor's removal of asbestos-containing materials from Owner's building and work site. Contractor must conduct its operations according to applicable requirements including but not limited to those established by:
1. Occupation Safety and Health Administration (OSHA).
2. Environmental Protection Agency (EPA).
3. Department of Transportation (DOT).
4. State or Local Air Pollution Control Authorities/Agencies.
5. State or Local Solid Waste or Hazardous Waste Authorities/Agencies.
6. State or Local Health Department(s).
7. State or Local Building Code Authorities.
8. Other federal, state or local agencies or authorities.

B. Contractor or Owner shall perform appropriate inspections, surveys and file timely notifications to

proper authorities prior to starting roof renovation or demolition activities. Inspectors, project planners, project managers, contractors and workers involved in the roof project shall have appropriate training, licenses and registrations. Contractor and Owner shall be responsible for determining and implementing regulatory compliance activities, including but not limited to work practices, engineering controls, personal protection, air monitoring, testing, hazard communication, material handling, record retention, and arranging for waste disposal/handling.

C. Contractor must file a Uniform Hazardous Waste Manifest from proper landfill site for each load of asbestos containing material removed. Copies must be sent to Owner and material manufacturer/specifier. Transportation of waste shall be in accordance with applicable Department of Transportation (DOT) requirements.

3.04 INSULATION

A. Manufacturer's Instructions: In regard to attachment, the manufacturer's instructions or specifications shall determine the suitability for an application. Installation must meet ASCE 7 criteria and meet local governing building codes.

B. Precautions: The surface of the insulation must not be ruptured due to overdriving of fasteners.

C. Thermal insulation boards shall be laid on the substrate in parallel rows with end joints staggered and butted as close as possible. All joints shall be tight and at the roof perimeter and roof penetrations, insulation shall be cut neatly and fitted to reduce openings to a minimum. All openings one-fourth inch (1/4") or larger shall be filled with insulation.

D. Insulation shall be tapered or feathered at drains and scuppers to provide proper drainage (if applicable). Shaving of insulation boards is not acceptable.

E. No more insulation shall be installed than can be covered by the completed roof system by the end of the day or the onset of inclement weather.

F. Tapered insulation and crickets, when specified, shall be placed in accordance with the drawings and/or as required to minimum of NRCA standards.

3.05 MECHANICALLY FASTENED INSULATION

A. Specified insulation shall be loose laid over the substrate using offset joints, so that each layer breaks joints to a minimum of six inches (6”) each way with the preceding layer. Then the specified cover board shall be laid over the thermal insulation layers and tapered insulation where applicable and mechanically fastened thru all underlying layers, the existing lightweight concrete and into the to the metal or wood decks to conform to the ASCE 7 criteria for wind uplift as dictated by wind zone applicable to location of project. Fasteners and fastening patterns shall be determined by building height, location and geographical area of the United States. It is the contractor's responsibility to consult current publications, literature, and bulletins of IBC and the manufacturer that are in effect at the time of this project. Boards shall be staggered and butted as close as possible with voids over one-fourth inch (1/4") to be filled.

3.06 NAILERS

A. Wooden nailers shall be installed at gravel stops, drip edges, and expansion joints on outside perimeter of building according to NRCA, Underwriters Laboratory and IBC guidelines.

B. All Construction: Nailers shall be the same height as the new recovery board being installed where required. Nailers shall be raised if necessary by anchoring an additional nailer of appropriate height to the existing nailer if the existing nailer is not to be replaced. Nailers shall be anchored to resist a pull-out force of one hundred seventy-five pounds (175#) per foot. Fasteners shall be no less than two (2) per nailer, and be spaced at three feet (3') on center maximum. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish roof height.

3.07 WOOD CANTS

A. Toe of cant shall be level with the surface to receive new roof membrane and in all cases anchored according to NRCA, Underwriters Laboratory and IBC guidelines.

3.08 COLD PROCESS APPLICATION OF BASE SHEET

A. Cover board shall be covered with SBS 80 mil SS base sheet adhered as follows:

All layers shall be applied using modified bitumen adhesive.by notched squeegee or spray equipment at the nominal rate of one and one-half to three (1.5 – 3) gallons per one hundred (100) square feet ± 20 percent. Sheets shall be lapped four inches (4")on the sides and six inches (6") on ends. Sufficient adhesive shall be applied at laps to result in a visible bead of adhesive at completed lap edge. End and side laps shall be rolled with a weighted roller immediately after installation. Specified layers shall be applied in accordance with the manufacturer's recommendations and in accordance with general practices as set forth by the NRCA Roofing Manual. NOTE: Base may not be left exposed more than five (5) days. NO EXPECTIONS.

3.09 COLD PROCESS APPLICATION OF FLEECE BACKED MEMBRANE

A. Adhered Application: Fully adhere membrane to acceptable substrate with substrate adhesive applied at the rate of one and one-half to three (1.5 – 3) gallons per one hundred (100) square feet ± 20 percent or as specified by the manufacturer.
   1. The roof surface must be clean, dry and free of foreign material.
   2. Position sheets as indicated on approved shop drawings. Membrane shall be applied shingle fashion, perpendicular to the slope of the roof deck.
   3. The membrane material shall be unrolled, cut into twelve feet to eighteen feet (12'-18') lengths, placed upside down and allowed to “relax” prior to installation. Then re-roll to apply.
   4. Install full width sheets, lapping four inches (4") on the sides and six inches (6") on ends. Stagger adjacent end laps a minimum of eighteen inches (18") apart. Where installed over base sheet, stagger sheet’s side and end laps from underlying plies.
   5. Starting at the low point or the drains, apply the modified bitumen cold adhesive to the substrate in either method as follows:
      a. Pour the adhesive on the substrate and spread, using a serrated edged squeegee, applied at the rate of 1-1/2 gal per square.
      b. Spray, using equipment that will apply the adhesive at a rate equal to one and one-half (1-1/2) gallons per square.
   6. Apply the adhesive so that the substrate is coated in a pattern slightly larger than the first sheet being applied.
   7. Lap seams shall be done by lapping the selvedge edge over the non-selvedge edge of the previous roll four inches (4"). End laps and selvage laps of the membrane being lapped shall be coated with adhesive so that a visible bead of adhesive appears. Roll all laps with a steel roller to ensure proper adhesion.

8. LAP OPTION: The end laps and side laps may be hot-air welded. The hot-air welding method will provide a watertight lap immediately and is preferable when inclement weather is threatening.
9. Carefully push into place from fold line to overlap, avoiding wrinkles and air pockets. Roll or broom membrane flat.
10. Repeat procedure for other sheet half.
11. T-joint covers are required over all T-joints on installations of thermoplastic roofing membranes equal to or greater than 60 mils in thickness. Center T-joint cover over the T-joint and completely hot air weld the cover to the field membrane.

B. Welded Lap Seaming Procedure: Overlap membrane for attachment method specified and hot-air welded with manufacturer's approved equipment.
1. All surfaces to be weld shall be clean, dry and free of foreign material.
2. All seams must then be checked with a needle probe and any voids repaired with the heat gun.

3.10 FLASHING

A. Flash all penetrations, metal edge systems, walls, curbs, expansion joints, drains as shown on details and approved shop drawings with white reinforced Elvaloy® flashing membrane.
1. Mechanically fasten flashing at terminations according to approved details.
2. Fastening membrane flashing through metal counterflashing is not acceptable.

B. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.11 BASE FLASHING (APPROXIMATELY 8" IN HEIGHT MINIMUM)

A. Base flashings shall be installed using the flashing membrane, with length of run not to exceed twenty linear feet (20').

B. Wooden nailers or curbs shall be installed at all edges and openings in the roof, mechanically fastened to the deck.

C. Cant strips shall be installed at the intersection of the deck and all vertical surfaces.

D. The roofing field membrane shall extend up over and two inches (2") above the top of cant strips at all vertical intersections or out to the roof's edge.

E. All existing substrates receiving flashing membrane shall be clean and primed with primer, prior to application as required.

F. All flashings shall be mechanically fastened with a termination bar a maximum of eight inches (8") on center, be a minimum of eight inches (8") above finished roof height, extend a minimum of four inches (4") onto the field of horizontal roof membrane, and not exceed twenty linear feet (20') of run in length.

G. After proper termination of the base flashing at a minimum eight-inch (8") height (or maximum eighteen-inch (18") height), a receiver reglet and counterflashing shall be installed according to NRCA and SMACNA guidelines.

H. All vertical flashing lap seams of the flashing membrane shall be hot-air welded.

I. All flashing membrane shall be adhered with flashing bonding adhesive to the vertical substrate and hot-air welded to the field of roof membrane; hot-air weld vertical laps.

J. Flashing laps shall be minimum two-inch (2") width, no maximum. Hot-air weld of flashing lap shall be minimum two-inch (2") width, no maximum.

K. Hot-Air Welding of Flashing Laps:
1. When using a hand-held hot-air welder, the seams should be pressed together using a hand-held roller. The speed and temperature settings of the welding equipment can be affected by the weather conditions at the site of application, therefore, these parameters should be set by trial and error using two (2) pieces of the flashing membrane. Minimum width of hot-air weld two inches (2"), no maximum.
2. Lay the laps together and apply pressure to the welded seam to ensure full adhesion.
3. Allow the seams to set fully, and probe the entire length for voids. Reseam voids immediately with a hot-air gun and roller.

L. All hot-air welded seams/laps shall be tested daily with a probe for integrity, no variance.

3.12 VERTICAL WALL FLASHING (FOR USE APPROXIMATELY 8-18" ABOVE THE FINISHED ROOF LINE AND EXTENDING UPWARD)

A. Flashing membrane shall be installed on the vertical beginning a minimum of eight inches (8") above the finished roof line (where the base flashing is terminated), with length of run not to exceed twenty feet (20'). Flashing shall be installed in strict accordance with the manufacturer's recommendations.

B. All existing substrates receiving flashing membrane shall be clean and primed with asphalt primer, prior to application.

C. All substrates receiving welded-seam flashing membrane shall be clean and primed with primer, prior to application when applicable.

D. The vertical wall flashing membrane shall be set in flashing bonding adhesive according to manufacturer's guidelines.

E. All vertical flashing lap seams of the flashing membrane shall be hot-air welded.

F. Flashing laps shall be minimum two-inch (2") width, no maximum. Hot-air weld of flashing lap shall be minimum two-inch (2") width, no maximum.

G. Immediately following the laying of the flashing membrane, it shall be pressed or rolled in the width direction of the membrane. This will prevent excessive entrapment of air beneath the membrane. The pressing or rolling shall be in the width direction and with the laps so as not to buck the laps.

H. Any flashing extending further than eighteen inches (18") up onto a vertical surface shall be installed using the strapped method and must be fastened with a termination bar or installed up and over the parapet wall and fastened to the nailer on the outside of the wall.

I. The flashing membrane shall be run up the wall in sheet widths, run under the coping cap and be terminated on the outside of the wall six inches (6") on center; then the coping cap shall be reset. All side laps are to be hot-air welded.

J. Hot-air Welding Laps:
1. When using a hand-held hot-air welder, the seams should be pressed together using a hand-held roller. The speed and temperature settings of the welding equipment can be affected by the weather conditions at the site of application; therefore, these parameters should be set by the contractor by using two (2) pieces of flashing membrane. Minimum width of hot-air weld shall be two inches (2").
2. Lay the laps together and apply pressure to the welded seam to ensure full adhesion.
3. Allow the seams to set fully and probe the entire length for voids. Re-seam voids immediately with a hot-air gun and roller.

K. All hot-air welded seams/laps shall be tested daily with a probe for integrity, no variance.

L. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.13 PERIMETER FASTENING

A. Wood nailers are required for perimeter gravel stops or drip edges. Field membrane and all plies shall be mechanically fastened to nailer on twelve-inch (12") centers maximum.

3.14 EDGING FLASHINGS

A. An NRCA-approved gravel stop/fascia system shall be installed in strict accordance with published instructions to meet ES-1.

3.15 ROOF DRAINS

A. Inspect and test drain and drain lines prior to start of work in contact area. Open if blocked or clogged and repair/replace all broken, missing above deck roof drain components as required. Verify in writing that all drains and lines are free flowing and watertight prior to substantial completion. Comply with local plumbing codes.

B. Remove strainer and clamping ring. Properly reset clamping ring and flashings and replace all roof drain strainers with new cast iron strainers to match existing drains.

3.16 WALKWAY PADS

A. Fully adhere and heat weld walkway pads where shown on drawings or where required to provide protected pathways from rooftop access points to mechanical or other equipment requiring rooftop maintenance.

3.17 CLEANING

A. Clean exposed surfaces of excess cement, adhesive, sealants, mortar and paint associated with the new work.

B. Clean work area of excess roofing materials and installation debris daily.

C. Repair or replace defaced or disfigured finishes caused by the work.

3.18 MEMBRANE CLEANING

A. After all membrane has been installed, it shall be cleaned with a cleaning agent compatible with the membrane to return the membrane to like new appearance.

3.19 PROTECTION

A. Protect all building surfaces against damage from roofing work.

B. Where traffic must continue over finished, installed roofing system, protect membrane, underlayment accessories and finishes from damage.

3.20 MEMBRANE PROTECTION

A. Where equipment pads, wood sleepers, or walkway slabs are to be installed over the roofing membrane, an additional layer of the roofing membrane shall be installed between the roofing membrane and the pad, sleeper, or slab. Due caution shall be exercised to prevent roofing membrane damage during placement. Where required, membrane shall be welded to field membrane to prevent slippage.

3.21 PIPING/CONDUIT

A. Piping/conduit shall be raised to NRCA recommended heights, and new supports furnished. Permanent supports shall be installed upon pads approved by membrane manufacturer. Coordinate work with Owner's representative.

B. All gas lines, piping, and conduits shall be coated with industrial grade yellow paint.

3.22 PIPE/EQUIPMENT SUPPORTS

A. Designated pipe/equipment supports shall be removed and replaced with new specified pipe supports. Pipe supports shall be placed approximately ten feet (10') on center. New blocks shall be set on a double layer of membrane and attached to the pipe with suitable strapping. Double layer of membrane shall be adhered to the roof surface.

B. Gas lines three inches (3") and over must be supported on wood block with pipe roll stands.

3.23 ROOF HATCH

A. Install hatch per manufacturer's guidelines.

B. Provide required structural members to properly install the roof hatch.

3.24 OVERNIGHT SEAL

A. Shall be performed according to accepted roofing practice as outlined in the NRCA Roofing Manual, SPRI and membrane manufacturer's recommended procedure.

B. The roofing membrane shall be sealed to the roof deck or existing roof at the end of the day or at the onset of inclement weather to prevent water from flowing into the completed roofing system. Temporary seals shall be removed upon resumption of work.

END OF SECTION 07 54 20

SECTION 07 62 00
SHEET METAL AND MISCELLANEOUS ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Provide flashing and sheet metal components for moisture protection.
2. Related accessories.

1.02 SUBMITTALS

A. Product Data:
1. Submit shop drawings, product data and mockups of all sheet metal.

1.03 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers in satisfactory use in similar service for five years. Use experienced installers. Deliver, handle and store materials in accordance with manufacturer's instructions.

B. Reference Standards: Applicable portions of SMACNA, ASTM and NAAMM publications.

1.04 WARRANTIES

A. Manufacturer's Product Warranty: Submit manufacturer's standard limited product warranty signed by the manufacturer's authorized official, guaranteeing to correct failures in product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the Owner/Project Consultant may have under the contract documents. Failure is defined to include product failure which leads to interruption of a watertight installation. Correction may include repair or replacement of failed product.

B. Contractor's Warranty period: For roofing flashing and sheet metal, provide a written warranty which shall warrant work to be free of leaks and defects in materials and workmanship for two (2) years, starting from date of substantial completion.

C. Defects of the sheet metal occurring during the warranty period shall be promptly corrected by the contractor, and defects of the roofing shall be promptly corrected by the manufacturer at no additional cost to the Owner. Upon notification from the Owner or the Owner's representative that evidence of a defect exists, the responsible party shall immediately inform the Owner's representative of the date on which corrective work will be scheduled and shall notify the Owner's representative when the corrective work has been completed.

PART 2 - PRODUCTS

2.01 SHEET METAL MATERIAL

A. Hot-dipped Galvanized Steel for use as counterflashings (where not visible from the ground), pitch pans and expansion joints: Minimum 24-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.

B. Hot-dipped Galvanized Steel for use as continuous clips: Minimum 20-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.

C. Prefinished Galvanized Sheet Steel (where visible from the ground): Shall be 24-gauge flat stock, prefinished with Kynar finish meeting ASTM A 446, forty-five and one-half inches to forty-eight inches width by one hundred twenty inches in length (45-1/2" - 48" x 120") for use as new metal edge gravel guard, downspouts, gutters, coping and miscellaneous metal. Standard color to be selected by Owner/Project Consultant.

D. Elvaloy□ Cladded Metal: Shall be G-90 galvanized steel with 25 mil Elvaloy□ membrane lamination; width shall be four feet, length shall be eight or ten feet.

E. Stainless Steel: QQ-S-766, Class 301, 302, 304, or 316; or ASTM A 167, Type 301, 302, 304, or 316; form and condition most suitable for the purpose.

F. Aluminum and Aluminum Alloy Plate and Sheet: QQ-A-250; form, alloy, and temper shall be that most suitable for the purpose.

G. Sheet Lead: QQ-L-201, Grade B.

H. All existing sheet metal shall be replaced with new metal of like gauge and type, or as specified on drawings.

2.02 FASTENERS

A. Fasteners shall be same metal as flashing/sheet metal, or other non-corrosive metal as recommended by sheet manufacturer for the specific application. Match finish of exposed heads with material being fastened.

B. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide.

C. Fastener for Brick: Shall be one-fourth inch by two inches (1/4" x 2"), zinc with plated steel or stainless-steel nail, one piece unit, flat head.

D. Screws: Self-taping sheet metal type with neoprene washer, as appropriate.

E. Pop Rivets: Full stainless-steel Series 42 or 44, as appropriate.

F. Continuous Clip: Concealed hold-down clip type; of same materials as coping, gravel guard, sized to suit application. Use a continuous clip, minimum 20-gauge G-90 galvanized.

2.03 RELATED MATERIAL

A. Bituminous Paint: Acid and alkali resistant, black color.
B. Plastic Cement: FS SS-C-153, cutback asphalt type.

C. Solder: For use with steel or copper, provide 50-50 tin/lead solder (ASTM B 32), with rosin flux.

D. Copper, Sheet, and Strip: QQ-C-576, ASTM B 370, light cold-rolled temper.

E. Lead-coated Copper: ASTM B 101, Type I or II, Class A.

F. Sealant (for Sheet Metal): One-component polyurethane, conforming to requirements of FS TT-S-230C, non-staining and non-bleeding.

G. Miscellaneous Materials:
1. Splash Blocks: Concrete, 3000 psi, 28 days. Provide and install with protection pads at all downspouts.
2. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size, and gauge required for performance.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, substrates are smooth and clean and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed and secure.

C. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Field measure site conditions prior to fabricating work. Provide all shop drawings and mock-ups one month prior to installation to the Owner/Project Consultant for approval.

B. Install starter and edge strips and cleats before starting installation.

3.03 FABRICATION - GENERAL

A. Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer's instructions and recommendations. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.

B. Fabricate gravel stops/fascia, gutters/downspouts, counterflashings, pitch pans, expansion joints, and copings with new galvanized sheet metal as specified. Fabricate gravel guard and fascia to size and dimensions as indicated on the drawings. Fabricate light metal coping, gutters and downspouts as indicated.

C. Form sheet metal on bending brake.

D. Shape, trim and hand seam metal on bench insofar as practicable.

E. Form materials with straight lines, sharp angles and smooth curves.

F. Fold back edges on concealed side of exposed edge to form hem (1/2" minimum).

G. Weld or solder joints on parts that are to be permanently and rigidly assembled.

H. Submit sheet metal models for approval by the Owner/Project Consultant.

I. Limit single-piece lengths to ten feet (10').

J. Fabricate corner pieces with eighteen-inch (18") extensions, mitered and sealed by forming as one piece.

K. Surface sand flange prior to applying any primers on Kynar metal.

L. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint.

M. All existing or missing metal rooftop projections shall be replaced. New rooftop projection details shall be as recommended in NRCA or SMACNA handbooks. All rooftop projections shall be cleaned, all joints sealed, and painted with a rust inhibitive paint. Standard color to be selected by the Owner/Project Consultant.

N. All sheet metal shall be sealed and watertight.

O. Metal work should be secured so as to prevent damage from buckling or wind. Where clips are shown, these are to be continuous.

P. All metal to receive bitumen or adhesive shall be first primed with asphalt primer.

Q. All prefinished metal shall be sanded and/or abraded prior to receiving primer.

R. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges are to be seamed, form seams, and solder.

S. Expansion Provisions: Form expansion joints of intermeshing hooked flanges, not less than one inch (1") deep, filled with mastic sealant (concealed within joints).

T. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with industry standards.

U. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

V. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

3.04 INSTALLATION

A. General: All sheet metal termination to vertical wall shall have a through-wall with receiver installed on masonry walls or prefabricated "Z" bar flashing pre-installed to fluid applied wall finished prior to installation of sheet metal termination. This applies to edge metal, base flashing closures and all vertical surface intersections. Refer to NRCA, SMACNA, and metal manufacturer's guidelines.

B. Elvaloy® cladded metal shall be fabricated as needed; follow these specifications and standard sheet metal practice for attachment to roof details.

C. Edge/Fascia:
1. Shall be installed with expansion joints, ten feet (10') on center, one-fourth inch (1/4") expansion leeway, with a cover plate.
2. Secure metal flashings per specifications.
3. Lock seams and end joints.
4. Form sections identical to profiles as shown or approved similar, to match existing building.
5. Fabricate corner pieces with minimum eighteen-inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
6. Hem exposed edges three-fourths inch (3/4") minimum.
7. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
8. Integrate flashing in a manner consistent with detailing.
9. Provide and install continuous clip around perimeter.
10. Shall be fabricated in accordance with all SMACNA provisions.

D. Coping:
1. Remove existing and replace with new metal coping as required for a permanent watertight installation.
2. All coping shall be manufactured with low profile standing seam metal to meet ES-1.
3. Shall be minimum 24-gauge prefinished Kynar installed in ten foot (10') sections maximum.
4. Vertical fascia shall extend minimum two and one-half inches (2-1/2") or be minimum one and one-half inches (1-1/2") below bottom of nailer, whichever is greater.
5. Secure metal flashings per specifications.
6. Lock seams and end joints.
7. Form sections identical to profiles as shown or approved similar, to match existing building.
8. Fabricate corner pieces with minimum eighteen-inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
9. Hem exposed edges three-fourths inch (3/4") minimum.
10. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
11. Integrate flashing in a manner consistent with detailing.
12. Provide and install continuous clip, minimum 20-gauge.
13. Shall be fabricated in accordance with all SMACNA provisions.

E. Expansion Joint Field and at Wall:
1. Shall be as outlined by details, and be in full compliance with all provisions of SMACNA and FM Global requirements for attachment, installation and recommendations.
2. Secure metal flashings per specifications.
3. Lock seams and end joints.
4. Form sections identical to profiles as shown or approved similar, to match existing building.
5. Fabricate corner pieces with minimum eighteen inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
6. Hem exposed edges three-fourths inch (3/4") minimum.
7. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
8. Integrate flashing in a manner consistent with detailing.
9. Provide and install continuous clip around perimeter.
10. Shall be fabricated in accordance with all SMACNA provisions.

F. Counterflashing:
1. Remove existing and replace with new metal counterflashing as required for a permanent watertight installation.

G. Gutter and Downspout:
1. Remove existing gutters and downspouts and replace with new as required for a permanent watertight installation.
2. Fabrication:
a) Fabricate gutter and downspouts of profile and size indicated.
b) Field measure site conditions prior to fabricating work.
c) Fabricate with required connection pieces.
d) Fabricate section square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.
e) Hem exposed edges of metal.
f) Form and seal all metal joints; provide for expansion joints per SMACNA.
3. Installation:
a) Install collector head, downspout, and accessories.
b) Join lengths with seams pop riveted and sealed watertight. Flash and seal gutter to downspouts and accessories.
c) Seal all metal joints watertight for full metal surface contact.
d) Gutter: SMACNA style profile; submit detail for approval.
e) Downspouts: Rectangular profile. Seal all joints, four inches by six inches (4" x 6") unless otherwise noted.
f) Support Brackets, Joint Fasteners: Profiled to suit gutters and downspouts.
g) Anchorage Devices: SMACNA requirements. Type recommended by fabricator.
h) Gutter: Kynar. Color and Finish to match, Box profile, six inches by six inches (6” x 6”) unless otherwise noted and as recommended by SMACNA.
i) Downspout Supports: Straps, Kynar. Color and Finish to match.

H. Scupper, Overflow Scupper, Collector Head and Downspout:
1. Fabrication:
a) Fabricate overflow scupper, collector head and downspout of profile and size indicated, taking care that the roof drain leader fits properly into the back of the collector head. Seal the pipe to the collector head for watertightness.
b) Field measure site conditions prior to fabricating work.
c) Fabricate with required connection pieces.
d) Fabricate section square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.
e) Hem exposed edges of metal.
f) Form and seal all metal joints; provide for expansion joints per SMACNA.
2. Installation:
a) Install collector head, downspout, and accessories.
b) Join lengths with seams pop riveted and sealed watertight. Flash and seal collector head to downspouts and accessories.
c) Seal all metal joints watertight for full metal surface contact.
d) Collector Head: SMACNA style profile; submit detail for approval.
e) Downspouts: Rectangular profile. Seal all joints, four inches by six inches (4" x 6").
f) Support Brackets, Joint Fasteners: Profiled to suit gutters and downspouts.
g) Anchorage Devices: SMACNA requirements. Type recommended by fabricator.
h) Collector Head Support: Kynar. Color and Finish to match, as recommended by SMACNA.
i) Downspout Supports: Straps, Kynar. Color and Finish to match.

I. Pitch Pans:
1. Install pitch pans of 24-gauge, G-90 galvanized steel with a 25 Mil Elvaloy® Kee membrane lamination according to NRCA standards, minimum of six inches by six inches (6" x 6").

2. Pitch pans shall be fabricated to a minimum of six inches (6") above the finished roof membrane. The top vertical edge of the thermoplastic clad metal must be folded over to conceal the uncoated side of the metal inside the pitch pan. The pitch pan flange must be a minimum of three- and one-half inches (3.5”) wide in contact with the horizontal roof plain or field of roof membrane.
3. Approved caulking or water block shall be applied under the pitch pan flange prior to securing the flange to the deck with approved fasteners a minimum of 4” on center.
4. All projections enclosed in pitch pans shall be cleaned in any manner suitable and coated with a rust inhibitive coating as approved by the Owner/Project Consultant. Coating shall be allowed to dry prior to pitch pan fill.
5. Base of pitch pans shall be filled with grout or cementitious binder to proper height and allowed to cure.
6. Top finish fill shall be self-leveling, one-part urethane pourable sealer maximum fill to within three-eighths inch (3/8") of top of pitch pan sides.
7. Strip the thermoplastic clad metal flange of the pitch pan to the field membrane with one strip of flashing membrane. The flashing membrane must extend from the outer edge of the pitch pan flange onto the field membrane a minimum of 3 inches and butt to the vertical sides of the pitch pan on all 4 sides. The flashing membrane shall be hot air welded to the thermoplastic clad metal pitch pan and to the field membrane. Hot air welds shall be a minimum of two inches (2”) wide.
8. Install preformed outside corners by hot air welding in place at all four (4) corners of the pitch pan.
9. Apply seam sealer to the edges of the flashing membrane.

J. Bonnets/Hoods:
1. Fabricate and install above all pitch pans, where necessary, or reinstall as applicable, metal bonnets over all pitch pans, NO EXCEPTIONS.
2. Bonnets/Hoods shall be manufactured with metal compatible with metal to which bonnet is to be attached.
3. On beams and other steel, weld in place bonnets fabricated from one-fourth inch (1/4") steel plate.
4. Draw band bonnets fabricated from 22-gauge galvanized steel may be used on circular projections.

3.05 FINISH

A. Backpaint concealed metal surfaces with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals. Exposed surfaces to be provided with a factory applied fluorocarbon Kynar finish meeting ASTM A 446 and AAMA specification 605.2 for high performance coating.

B. New 24-gauge hot-dipped galvanized metal shall be painted on all locations visible from the ground with an industrial grade paint to match existing, or standard color selected by Owner/Project Consultant. Galvanized metal surface must be properly prepared by removing all oil, grease, and/or protective mill coatings by solvent cleaning surface in accordance with SSPC-SP1, and according to paint manufacturer's recommendation, to ensure proper adhesion of paint to metal.

END OF SECTION 07 62 00

SECTION 07 92 00
SEALANTS AND CAULKING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work includes:
   1. Throughout the Work, seal and caulk joints where shown on the Drawings and/or as required by the Architect/Project Manager to provide and maintain watertight and airtight continuous seals.
   2. This section includes, but is not limited to, providing joint sealants to be in the following areas:
      a) Exterior openings
      b) Perimeter of soffits to wall surfaces
      c) Control and expansion joints in masonry and concrete walls
      d) Trim moldings to wall surfaces
      e) Parapet cap copings and counterflashings at roofing conditions
      f) Perimeter joints of plumbing fixtures
      g) All other joints as directed by the Architect/Project Manager

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who have successfully completed a minimum of three projects in the last five years of similar type and scope as the project herein. The workmen shall be thoroughly trained and experienced in joint sealant applications and completely familiar with the specified requirements and methods needed for the proper performance of the work of this section.

B. Joint sealer products shall be obtained from a single manufacturer for each product required.

C. Job Site Testing
   1. All joint sealants shall be field tested for proper adhesion to the joint substrates prior to installation. Do not proceed with the work until job site tests have been approved by the Architect/Project Manager.
   2. Locate and provide test joints for each type of joint sealant, and substrate as directed by the Architect/Project Manager.
   3. Acceptable test joints will be used as the standard for all joint sealant work on the project.
   4. Sealants which fail to adhere to the substrates shall be removed and replaced at no extra cost to the Owner.

1.03 SUBMITTALS

A. Product Data: Within fifteen (15) calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
   3. Manufacturer's recommended installation procedures which, when approved by the Architect/Project Manager, will become the basis for accepting or rejecting actual installation procedures used on the Work.

B. Samples: Accompanying the submittal described above, submit samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used. Include color samples of full standard product color range.

1.04 PRODUCT HANDLING

A. Do not retain at the job site material which has exceeded the shelf life recommended by its manufacturer.

B. Store products on site in compliance with the manufacturer's recommendations and as necessary to prevent damage or deterioration to the materials.

1.05 WARRANTY

A. All sealants and caulking shall be provided with a five (5) year manufacturer's warranty.

PART 2 – PRODUCTS

2.01 SEALANTS AND CAULK

A. Except as specifically otherwise approved by the Architect/Project Manager, use only the types of sealants described in this Section. Polysulfide sealants require manufacturer's corporate seal.

B. Vertical surfaces and non-traffic bearing horizontal surfaces:
1. One-part Urethane Sealant: Sealant for use at coping joints, reglet joints, etc., shall be a one-component urethane non-sag, gun grade sealant designed for use in active exterior joints, and shall meet or exceed Federal Specification No. 1 TT-S-00230C, Type II, Class A, ASTM C 920. Where joint surfaces are contained or are contaminated with bituminous materials, provide manufacturer's modified-type sealant, as manufactured by Sonneborn, or approved equal.

C. Colors
1. Colors for each sealant installation will be selected by the Architect/Project Manager from standard colors normally available from the specified manufacturers.
2. Should such standard color not be available from the approved manufacturer except at additional charge, provide such colors at no additional cost to the Owner.

2.02 PRIMERS

A. Use only those primers which are non-staining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

A. Use only those backup materials which are specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and which are non-staining.

B. Acceptable types include:
1. Closed-cell resilient urethane or polyvinyl-chloride foam;
2. Closed-cell polyethylene foam;

3. Closed-cell sponge of vinyl or rubber;
4. Polychloroprene tubes or beads;
5. Polyisobutylene extrusions

C. Preformed support strips for ceramic tile control joint and expansion joint work: Use polyisobutylene or polychloroprene rubber.

2.04 BOND-BREAKER TAPE

A. Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.05 MASKING TAPE

A. For masking around joints, provide masking tape complying with Fed Spec UU-T-I06c.

2.06 EXPANDED POLYETHYLENE JOINT FILLER

A. Provide flexible, compressible, closed-cell, polyethylene of not less than 10 psi compression deflection (25%); except provide higher compression deflection strength as may be necessary to withstand installation forces and provide proper support for sealants, surface water absorption of not more than 0.1 pounds per square foot, as manufactured by Sonneborn, or approved equal.

2.07 JOINT PRIMER/SEALER

A. Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

2.08 BOND BREAKER TAPE

A. Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

2.09 SEALANT BACKER ROD

A. Provide compressible rod stack of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, non-absorptive material as recommended by sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type which will not be deteriorated by sealant application temperature as indicated.

2.10 FLUID APPLIED URETHANE DECK SEALANT SYSTEM

A. Shall be a two layer, minimum sixty (60) mil dry film thickness, two-component liquid urethane waterproofing system suitable for concrete deck application (exposed), as manufactured by Gates Engineering, UDC-82, or approved equal.

2.11 MULTI-COMPONENT POLYURETHANE SEALANT

A. Except as otherwise indicated, provide manufacturer's standard, non-modified, 2-or-more-part, polyurethane-based, elastomeric sealant; complying with either ASTM C 920, Type M, Class 25, or FS TT-S-00227E, Class A; self-leveling grade/type where used in joints of surfaces subject to traffic, otherwise non-sag grade/type, as manufactured by Sonneborn, or approved equal.

B. Durability: Less than 0.5 square inch adhesion/cohesion loss for three (3) samples of both mortar and aluminum; ASTM C 719 test procedure.

C. Adhesion in Peel: Fifteen-pound (15#) peel strength and 10% maximum loss of bond to substrate; ASTM C 794.

D. Bituminous Modification: Where joint surfaces contain or are contaminated with bituminous materials, provide manufacturer's modified type sealant which is compatible with joint surfaces (modified with coal-tar or asphalt as required).

PART 3 – EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Concrete and masonry surfaces
1. Install only on surfaces which are dry, sound, and well brushed, wiping free from dust.
2. At open joints, remove dust by mechanically blown compressed air if so required.
3. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
5. Remove laitance and mortar from joint cavities.
6. Where backstop is required, insert the approved backup material into the joint cavity to the depth needed.

B. Steel surfaces
1. Steel surfaces in contact with sealant:
Sandblast as required to achieve acceptable surface for bond.
a) If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.
b) Use solvent to remove oil and grease, wiping the surfaces with clean rags.
2. Remove protective coatings on steel by sandblasting or by using a solvent which leaves no residue.

C. Aluminum surfaces
1. Aluminum surfaces in contact with sealant:
a) Remove temporary protective coatings, dirt, oil, and grease.
b) When masking tape is used for protective cover, remove the tape just prior to applying the sealant.

2. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.03 INSTALLATION OF BACKUP MATERIAL

A. Use only the backup material recommended by the manufacturer of the sealant used and approved by the Architect/Project Manager for the particular installation, compressing the backup material 25 to 50 percent to achieve a positive and secure fit.

B. When using backup of tube rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

3.04 PRIMING

A. Use only the primer recommended by the manufacturer of the sealant and approved by the Architect/Project Manager for the particular installation, applying in strict accordance with the manufacturer's recommendations as approved by the Architect/Project Manager.

3.05 BOND-BREAKER INSTALLATION

A. Provide an approved bond-breaker where recommended by the manufacturer of the sealant for preventing the sealant to adhering to rigid, inflexible joint filler materials or to joint surfaces at back of joint where such adhesion would result in sealant failure. Adhere strictly to the installation recommendations as approved by the Architect/Project Manager.

3.06 INSTALLATION OF SEALANTS

A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect/Project Manager, and verify that the required proportion of width of joint to depth of joint has been secured.

B. Comply with ASTM C1193 for application of joint sealants.

C. Equipment:
1. Apply sealant under pressure with power-actuated or hand gun, or by other appropriate means.
2. Use guns with nozzle of proper size and providing sufficient pressure to completely fill the joints as designed.

D. Thoroughly and completely mask joints where the appearance of sealant on adjacent surfaces would be objectionable.

E. Install the sealant in strict accordance with the manufacturer's recommendations as approved by the Architect/Project Manager, thoroughly filling joints to the recommended depth.

F. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.

G. Do not install sealant when air temperature is under 40 degrees F. Sealant temperature to be at least 50 degrees F; controlled warming permitted to ease installation.

H. Cleaning up:
1. Remove masking tape immediately after joints have been tooled.
2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.

3.07 REGLET JOINTS, CAULK JOINTS, WALL JOINTS, AND WALL CRACKS ABOVE THE ROOF LINE

A. All reglet and horizontal edge metal and coping metal on exterior of wall shall be raked clean of loose materials and debris and sealed with caulk sealant. Sealant shall be properly installed and tooled in a workmanlike manner to ensure permanent seal.

B. All open coping and masonry terminations and intersections shall be cleaned out and sealed with backer rod and caulk sealant. Backer rod shall be minimum one and one-half (1-1/2) times the width of the opening to be sealed. Caulk sealant thickness shall be minimum of one-half (1/2) of the width of the opening to be sealed.

C. Clean joint surfaces immediately before installation of gaskets, sealant or caulking compound. Remove dirt, insecure coatings, existing sealant, moisture, and other substances which could interfere with seal of gasket or bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.

D. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.

E. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

F. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.

G. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint to bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

H. For normal moving joints to be sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than one-half inch (1/2") deep nor less than one-fourth inch (1/4") deep.

END OF SECTION 07 92 00

SECTION 09 97 23
ELASTOMERIC WALL COATINGS
ALTERNATE #1

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. **Alternate #1 Work Included at Clover Elementary School only:** Provide application of coating to protect all exterior face of EIFS, Concrete plaster/stucco and CMU walls, full height, as specified herein, and as needed for a complete and proper installation.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

B. Federal Specifications and Standards

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's product data sheets on all products to be used for the work. Submit description for protection of surrounding areas and non-masonry surfaces, surface preparation, application, and final cleaning.

B. Applicator Qualifications: Submit qualifications of applicator.
1.Certification stating applicator is experienced in the application of the specified products.

C. List of recently completed parapet coating projects, including project name and location, names of owner and architect, and description of products used substrates, applicable local environmental regulations, and application procedures. Environmental Regulations: Submit applicable local environmental regulations.

D. Submit sample of Manufacturer’s 10 Year Labor and Materials Warranty and Contractor’s 2 Year Labor Warranty.

E. Submit current letter from manufacturer show the applicator is an Approved Applicator by the manufacturer.

F. Submit a physical mock-up sample of the completed system and final color selections showing all products in their representative dry mil thickness to accurately show the system being installed.

G. Submit manufacturer’s full range of color samples. Color to be selected by Owner’s project manager or duly appointed representative.

1.04 QUALITY ASSURANCE

A. Qualifications:
1. Applicator: Minimum of five (5) years experience in the successful application of elastomeric acrylic textured coatings. Successful completion of a minimum of three projects of similar size and complexity to the specified work.

2. Manufacturer: Minimum five (5) years experience in manufacturing of cementitious products and acrylic textured coatings.

B. Mock-up: Install at the project site a pre-selected job mock-up, five feet by five feet (5' x 5'), using specified coating system. Obtain Architect/Engineer/Owner's approval of surface preparation, repair, color, texture, finish and workmanship as a standard by which remainder of the project will be judged. Apply material in strict accordance with manufacturer's written application instructions. **Mock-up must be approved and accepted prior to start of system application. Maintain mock-up during construction for workmanship comparison. Do not alter, move or destroy mock-up until the work is completed and approved by the Owner's representative.**

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer’s recommended provisions for product storage and handling requirements.

B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Deliver coating system materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Store tightly sealed coating system materials off the ground and away from moisture, direct sunlight, extreme heat and freezing temperatures.

1.06 PROJECT CONDITIONS

A. Substrate and ambient air temperature shall be a minimum of 40° F (4° C) and rising at application time and remain above 40° F (4° C) for at least 24 hours after application.

B. Do not apply coatings in snow, rain, fog, mist or at temperatures less than 5° F (2° C) above the dew point. Allow surfaces to attain temperature and conditions specified before proceeding with coating application. Do not apply if rain is anticipated within 24 hours of application.

C. Provide protection for plants, vegetation, automobiles, equipment, sidewalks, pavers, tile, etc. from overspray or damage could result. Contractor is responsible for all damages.

1.07 WARRANTY

A. Provide manufacturer’s warranty for work against defects in materials and workmanship for ten (10) years following completion of work. Warranty should specifically provide for a watertight condition for all completed work.

B. Provide contractor’s full warranty for work against defects in the workmanship for two (2) years following completion of work. Warranty shall provide for a watertight condition for all completed work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. BASF Corporation, Construction Chemicals, 889 Valley Park Drive, Shakopee, MN 55379, 512-496-6000 or pre-approved equal.

2.02 MATERIALS

A. MASTERPROTECT EL 750AA (formerly THOROLASTIC), 2-Coat Elastomeric, Algae-resistant, Acrylic Coating System, Topcoat color as selected by the architect/owner.

B. Performance Requirements: A two coat system for MASTERPROTECT EL 750AA (formerly Thorolastic) at 16 to 20 mils DFT shall meet or exceed the following performance standards.

Elongation Recovery	ASTM D412	After 10 min. 96.9% After 24 hours, 98.4%
Ultimate Elongation	ASTM D 412	344%
Ultimate Tensile Strength, psi	ASTM D412	220 psi
Density, lbs/gal	ASTM 1475	11.2 – 12.2
Solids, %	ASTM D 5201	By weight 64.2 By volume 50
Viscosity, KU	ASTM D 562 (Stormer)	127-135
Crack Bridging, mils(mm)	PR EN 1062-7	@ -77°F (-60°C) = 12 (0.3) @ 32°F (0°C) = 19.5 (0.5) @ 73°F (23°C) = 27.5 (0.7)
Accelerated Wearthering	ASTM G23, Type D	5,000 hrs. = No defects 400 hrs. = Meets requirements
Mildew Resistance	ASTM D-3273 / 3274	No growth.
Anti-algae Resistance	Singapore Test, SS 345; 1990	
Salt Spray Resistance	ASTM B-117	300 hours=No defects
Wind Driven Rain Resistance	TT-C-555-B	No water penetration
Water Vapor Transmission	ASTM 1653	Perms=10
Flexibility, in(mm) mandrel At -30°F (-34°C)	ASTM D 522	1/8 (3)
Freeze/Thaw resistance	ASTM C 67	60 cycles

2.03 RELATED MATERIALS

A. Sealant
1. MasterProtect Sealant NP-1 or pre-approved equal, Polyurethane Sealant.

B. Crack Repair
1. MasterProtect EL746 & EL748 or pre-approved equal; an elastomeric crack filler. As recommended by the manufacturer.

C. Primer or Surface Conditioner
1. MasterProtect P100 primer or pre-approved equal, for soft, friable aggregate surfaces, as recommended by the manufacturer.
2. MasterProtect P150 primer or pre-approved equal, for new, aged or previously coated cementitious surfaces, as recommended by the manufacturer.
3. MasterProtect FL749 blockfiller or pre-approved equal, for CMU or other porous or open substrates, as recommended by the manufacturer.

2.04 MIXES

A. Mix coating system materials in accordance with manufacturer's printed recommendations and product technical bulletins. Mix with approved mechanical mixers using light agitation to ensure color uniformity, aggregate dispersion and to minimize air entrapment.
1. In multi-pail applications, mix contents of each new pail into the partially used pail to ensure color consistency and smooth transitions.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect adjacent work areas and finish surfaces from damage during coating system application.

B. Test and clean substrate in accordance with coating system manufacturer's recommendations and the following national standards:
1. ASTM D 3359 Methods for Measuring Adhesion by Tape Test
2. ASTM D 4258-83 (1988) Surface Cleaning Concrete for Coating
3. ASTM D 4259-88 Practice for Abrading Concrete
4. ASTM D 4261-83 (1988) Practice for Surface Cleaning Concrete Masonry for Coating
5. ASTM D 4285-83 (1988) Indication Oil or Water in Compressed Air
6. ASTM D 4541-85 (1989) Pull-Off Strength of Coatings Using Portable Adhesion Testers
7. ICRI Tech Guide #32 Selecting and Specifying Surface Prep for Concrete

C. Substrate shall be sound, clean, dry and free of all dust, dirt, oils, grease, laitance, efflorescence, mildew, fungus, biological residues, chemical contaminants or previous coatings that could prevent good adhesion. Removal shall be by approved methods demonstrated during mock-up.

D. Repair all spalled areas and voids with MasterEmaco N426 patch according to the manufacturer’s recommendations..

E. Remove all loose, soft, friable mortar. Replace with new to match existing mortar. Cure replacement mortar seven (7) days.

F. Repair cracks in surface up to 1/16" x 1/16" with MasterProtect EL746 & EL748, as recommended by manufacturer.

G. Repair cracks in surface up to 1/4" x 1/4" with MasterProtect EL746 & EL748, as recommended by manufacturer.

H. Treat, neutralize and remove efflorescence, mold, and mildew prior to coating application with suitable cleaner as recommended by manufacturer.

I. Substrate shall exhibit a surface profile of CSP 3 – CSP 6 as specified by ICRI Tech Guide #32.

3.02 APPLICATION

A. Apply MasterProtect P100 at a rate not to exceed 375 square feet per gallon or MasterProtect P150 at a rate not to exceed 275 square feet per gallon or MasterProtect FL749 at a rate not to exceed 100 square feet per gallon. Allow a minimum of two to four hours drying time before top coats are applied.

B. Apply two coats of MasterProtect EL750 AA by brush, roller, or spray and backroll to achieve a waterproof finish.

C. Application shall be roller applied use a 3/4" to 1" nap roller cover. Keep rollers fully loaded with material, cross-roll working uniformly, maintaining a wet edge throughout. Material may need to be brush applied into mortar joints.

D. Allow MasterProtect EL750 AA to cure a minimum of 12 to 24 hours between applications at a minimum of 70° F. and percent relative humidity. Lower temperatures and higher relative humidity will require longer curing times.

E. Finished system shall be pin-hole free.

F. Match approved samples for color, sheen and coverage. Remove, refinish or recoat work not in compliance with Contract documents.

3.03 CLEANING AND PROTECTION

A. Remove temporary coverings and protection of adjacent work areas. Remove over-spray coating from areas not intended to be coated. Remove construction debris from project site.

B. Project applied coating system finish from damage during construction.

END OF SECTION 09 97 23