PROJECT MANUAL

For the Construction of:

JEROME 1, 4, 6 & - PARKING LOT REPLACEMENT
JEROME IDAHO STAKE
PROPERTY NO. 52027012202010 1

26 NORTH 100 EAST
JEROME, IDAHO 83338

THE CHURCH OF
JESUS CHRIST
OF LATTER-DAY SAINTS

SEPTEMBER 2023

GENE C. ULMER
ARCHITECT

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FIXED SUM PROJECT (U.S.)

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INVITATION TO BID (U.S.)

1. GENERAL CONTRACTORS INVITED TO BID THE PROJECT:

TBD

2. PROJECT:

Jerome 1, 4, 6 & - Parking Lot Replacement

3. LOCATION:

26 North 100 East, Jerome, Idaho 83338

4. OWNER:

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
50 East North Temple St., COB12
Salt Lake City, Utah 84150

5. CONSULTANT:

Gene C. Ulmer Architect

6. DESCRIPTION OF PROJECT:

A. Replacement of existing parking lot asphalt, base, concrete sidewalks, curbs and gutters.

B. Products or systems may be provided through relationships the Owner has negotiated with suppliers as indicated in the Specifications.

7. TYPE OF BID: Bids will be on a lump-sum basis. Segregated bids will not be accepted.

8. TIME OF SUBSTANTIAL COMPLETION: The time limit for substantial completion of this work will be 60 calendar days and will be as noted in the Agreement.

9. BID OPENING: Bids will be received by Owners preferred method at (time and date at place) to be announced. Bids will be publicly opened at (time and date at place) to be announced.

10. BIDDING DOCUMENTS:

A. Bidding Documents may be examined at the following plan room locations:

1) NA

2) NA

3) NA

4) NA

B. Bidding Documents may be obtained from the Architect.

C. Bidding Documents may be obtained from Owner's electronic bidding tool.

11. BID BOND: If required, bid security in the amount of 5 percent (5%) of the bid will accompany

each bid in accordance with the Instruction to Bidders.

12. BIDDER'S QUALIFICATIONS: Bidding by the General Contractors will be by invitation only.

13. OWNER'S RIGHT TO REJECT BIDS: The Owner reserves the right to reject any or all bids and to waive any irregularity therein.

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS (U.S.)

1. DEFINITIONS:

A. The definitions set forth in Section 1 of the General Conditions are applicable to the documents included under Bidding Requirements.

B. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The proposed Contract Documents consist of the documents identified as Contract Documents in the Form of Agreement, except for Modifications. The Bidding Requirements are those documents identified as such in the proposed Project Manual.

C. Addenda are written, or graphic documents issued by the Architect prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Form of Agreement upon execution of the Contract.

2. BIDDER'S REPRESENTATIONS:

A. By submitting a bid, the bidder represents that
   1) Bidder has carefully studied and compared the Bidding Documents with each other. Bidder understands the Bidding Documents and the bid is fully in accordance with the requirements of those documents,
   2) Bidder has thoroughly examined the site and any building located thereon, has become familiar with local conditions which might directly or indirectly affect the contract work, and has correlated its personal observations with the requirements of the proposed Contract Documents, and
   3) Bid is based on the materials, equipment, and systems required by the Bidding Documents without exception.

3. BIDDING DOCUMENTS:

A. Copies
   1) Bidding Documents may be obtained as set forth in the Invitation to Bid.
   2) Partial sets of Bidding Documents will not be issued.
   3) Bidders will use complete sets of Bidding Documents in preparing bids and make certain that those submitting sub-bids to them have access to all portions of the documents that pertain to the work covered by sub-bid, including General Conditions, Supplementary Conditions, and Division 01. Bidder assumes full responsibility for errors or misinterpretations resulting from use of partial sets of Bidding Documents by itself or any sub-bidder.

B. Interpretation or Correction of Bidding Documents
   1) Bidders will request interpretation or correction of any apparent errors, discrepancies, and omissions in the Bidding Documents.
   2) Corrections or changes to Bidding Documents will be made by written addenda.

C. Substitutions and Equal Products
   1) Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
   2) The terms *'Acceptable Manufacturers', 'Approved Manufacturers 'Suppliers', Installers'* and *'VMR (Value Managed Relationship) Manufacturers / Suppliers / Installers'* are used throughout the Project Manual to differentiate among the options available to Contractor regarding specified products, manufacturers, and suppliers. See Section 016000 for options available regarding acceptance of equal products.
   3) Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding Documents.

4) Architect is only authorized to consider requests for approval of equal products to replace specified products in Sections where the heading '*Acceptable Manufacturers*' is used and statement, *'Equal as approved by Architect before bidding. See Section 016000'* or *'Equal as approved by Architect before installation. See Section 016000,'* appears. In Sections where the afore-mentioned statements do not appear and a different heading is used, Architect is authorized as Owner's representative to decline consideration of requests for approval of equal products. Approvals of equal products in such Sections must be made by Owner and will generally be for subsequent Projects.

D. Addenda - Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than 2 business days prior to bid opening.

4. BIDDING PROCEDURES:

A. Form and Style of Bids
1) Use Owner's online bidding tool.
2) Fill in all blanks on online bidding tool. Signatures will be executed by representative of bidder duly authorized to make contracts.
3) Bids will bear no information other than that requested on bid form. Do not delete from or add to the information requested on the bid form.

B. Bid Security
1) If required, each bid will be accompanied by a bid bond naming Owner, as listed in the Agreement, as obligee. If Bidder refuses to enter into a Contract or fails to provide bonds and insurance required by the General Conditions, amount of bid security will be forfeited to Owner as liquidated damages, not as a penalty.
2) Bid bond will be issued by a surety company meeting requirements of the General Conditions for surety companies providing bonds and will be submitted on AIA Document A310, Bid Bond or AIA authorized equivalent provided by surety company. The attorney-in-fact who executes the bond on behalf of the surety will affix to the bond a certified and current copy of the power of attorney.
3) Owner may retain bid security of bidders to whom an award is being considered until -
a. Contract has been executed and bonds have been furnished,
b. Specified time has elapsed so bids may be withdrawn, or
c. All bids have been rejected.

C. Submission of Bids
1) Follow the instructions in the Owner's bidding tool when submitting your bid.
2) It is bidder's sole responsibility to see that its bid is received at specified time.
3) No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

D. Modification or Withdrawal of Bid
1) Bidder guarantees there will be no revisions or withdrawal of bid amount for 45 days after bid opening.
2) Prior to bid opening, bidders may withdraw bid from Owner's bidding tool.

5. CONSIDERATION OF BIDS:

A. Opening of Bids - See Invitation to Bid.

B. Rejection of Bids - Owner reserves right to reject any or all bids and to waive any irregularity therein.

C. Acceptance of Bid
1) No bidder will consider itself under contract after opening and reading of bids until Agreement between Owner and Contractor is fully executed.
2) Bidder's past performance, organization, subcontractor selection, equipment, and ability to perform and complete its contract in manner and within time specified,

together with amount of bid, will be elements considered in award of contract.

6. POST-BID INFORMATION:

A. The conditionally accepted bidder submitting a bid involving subcontractors will submit its list of proposed subcontractors within 24 hours after bid opening.

7. PERFORMANCE BOND AND PAYMENT BOND:

A. Bond Requirements - Performance Bond and Labor and Material Payment bond may be required for this Project as specified in the General Conditions.

B. Time of Delivery of Bonds - Bonds will be delivered to Owner with Agreement signed by bidder.

8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

A. Agreement form will be “Agreement Between Owner and Contractor for a Fixed Sum (U.S.)” provided by Owner.

9. MISCELLANEOUS:

A. Pre-Bid Conference
   1) A pre-bid conference will be held at a time and place to be announced.

B. Liquidated Damages - Conditions governing liquidated damages are specified in the General Conditions and in the Supplementary Conditions.

C. Examination Schedule for Existing Building and Site
   1) TBD

D. Exemption from local taxes - See Supplementary Conditions

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INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. GEOTECHNICAL DATA

A. Geotechnical Report -

1) Owner has secured the services of a geotechnical engineer to aid in design of the Project. Following conditions apply -

a) A geotechnical report has been prepared by Terracon Consultant, Inc., referred to as the Geotechnical Engineer.

b) A copy of this report will be issued to each invited Contractor.

c) This report was obtained solely for use in design by Consultant and is not a part of the Contract Documents. It is not intended that Contractor rely on geotechnical engineer's report.

d) Reports are provided for Contractor's information but are not a warranty of subsurface conditions.

2) Prior to bidding, Contractor may make his own subsurface investigations to satisfy himself with site and subsurface conditions.

2. ASBESTOS-CONTAINING MATERIAL (ACM)

A. The building upon which work is being performed has been examined for asbestos-containing material. The following have been identified as containing asbestos in the areas of the building being worked on as part of this Project:

1) None

B. Refer to Section N/A, Article N/A for requirements to be followed.

END OF DOCUMENT

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SUBCONTRACTORS AND MAJOR MATERIALS SUPPLIERS LIST

Project Name: _____ Date:_____

Stake: _____ Project No: _____

General Contractor: _____

General Contractor is to provide the names of the following subcontractors and suppliers to the Owner's Project Manager immediately following the bid opening:

VMR SUBCONTRACTORS

Roofing _____

Doors, Frames & Hardware _____

Storefronts _____

Wood Flooring _____

Other _____

Other _____

SUBCONTRACTORS AND SUPPLIERS

Grading / Site work _____

Site Utilities _____

Demolition _____

Paving _____

Termite Control _____

Site Concrete _____

Fencing _____

Irrigation System _____

Landscaping _____

Building Concrete _____

Masonry _____

Structural Steel _____

Framing _____

Trusses _____

Insulation _____

EIFS _____

Soffit / Fascia _____

Steeple _____

Millwork _____

Drywall _____

Ceramic Tile _____

Acoustical Tile _____

Painting _____

Wall Coverings _____

Elevators / Lifts _____

Draperies _____

Fire Sprinklers _____

Plumbing _____

HVAC _____

Electrical _____

Controls _____

Sound / Satellite _____

EQUAL PRODUCT APPROVAL REQUEST FORM (U.S.)

Project Name: _____ Request Number: _____

TO: _____

FROM: _____

BID DATE: _____

A proposed product is not legally approved and cannot legally be included in a bid or used in the Work until it appears in an Addendum or other Contract Modification as defined in the General Conditions. See Instructions To Bidders Paragraph 3.C, General Conditions, and Section 016000.

PROPOSED EQUAL PRODUCT:

Specification Section: _____

Specified Products: _____

Proposed Product: _____

The Undersigned certifies:

1. Proposed equal product has been fully investigated and determined to be equal or superior in all respects to specified products.
2. Same warranty will be furnished for proposed equal product as for specified products.
3. Same maintenance service and source of replacement parts, as applicable, is available.
4. Proposed equal product will have no adverse effect on other trades and will not affect or delay progress schedule.
5. Proposed equal product does not affect dimensions and functional clearances.

ATTACHMENTS:

Include the following attachments -

1. Copy of the Project Manual Section where the proposed equal product would be specified, rewritten or red-lined to include any changes necessary to correctly specify the proposed equal product. Identify completely changes necessary to the original Project Manual Section.
2. Copies of details, elevations, cross-sections, and other elements of the Project Drawings redone as necessary to show changes necessary to accommodate proposed equal product. Identify completely the changes from the original Drawings.
3. Complete product literature and technical data, installation and maintenance instructions, test results, and other information required to show complete conformance with requirements of the Contract Documents.

SIGNED: _____

Printed Name _____

Company _____

Address _____

City, State, Zip Code _____

Telephone _____ Fax _____

REVIEW COMMENTS:

_____ Accepted. See Addenda Number _____.

_____ Submission not in compliance with instructions. Respond to attached comments and resubmit.

_____ Proposed equal product not acceptable. Use specified products.

_____ Not Reviewed. Submission received too late. Use specified products.

ADDITIONAL COMMENTS:

BY: _____ **DATE:** _____

CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

PROJECTS FOR:
THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS,
a Utah corporation sole

Building Name: Jerome 1, 4, 6 &

Building Plan Type: Cody 1981

Building Address: 26 North 100 East, Jerome, Idaho 83338

Building Owner: The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole.

Project Number: 520270122020101

Completion Date:

As PROJECT CONSULTANT and principal in charge; based on my best knowledge, information, inspection, and belief; I certify that on the above referenced Project, no asbestos-containing building materials were specified in the construction documents or given approval in shop drawings or submittals.

Project Consultant and Principal in Charge (signature) Date

Gene C. Ulmer Architect
Company Name

As GENERAL CONTRACTOR in charge of construction; based on my best knowledge, information, inspection, and belief; I affirm that on the above-referenced Project, no asbestos-containing building materials were used in the construction.

General Contractor (signature) Date

Company Name

AGREEMENT BETWEEN OWNER AND CONTRACTOR
FOR A FIXED SUM (U.S.)

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole ("Owner") and _____ ("Contractor") hereby enter into this *Agreement Between Owner and Contractor for a Fixed Sum (U.S.)* ("Agreement") and agree as follows:

1. **Property/Project.**

   Property/Project Number:
   Property Address ("Project Site"):

   Project Type:
   Project Name ("Project"):

   Stake Name:

2. **Scope of the Work.** Contractor will furnish all labor, materials, equipment, construction, and services necessary to complete the Work in accordance with the Contract Documents.

3. **Contract Documents.**
   a. The Contract Documents consist of:
      1) This Agreement;
      2) The General Conditions for a Fixed Sum (U.S.), the Supplementary Conditions for a Fixed Sum (U.S.), and the Specifications (Divisions 01 through 49) contained in the Project Manual entitled _____, dated _____ and prepared by _____ ("Architect");
      3) The Drawings prepared by Architect entitled _____, sheet numbers _____, dated _____;
      4) Addendum No. _____ dated _____; and
      5) All Modifications to the Contract Documents.
   b. The Contract Documents are incorporated into this Agreement by reference as if fully set forth herein.
   c. The definitions set forth in the General Conditions for a Fixed Sum (U.S.) will apply to the Contract Documents.
   d. The Contract Documents contain the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations, or agreements, either written or oral.
   e. Modifications or other amendments to the Contract Documents must be in writing and as provided in the General Conditions for a Fixed Sum (U.S.).

4. **Time of Commencement and Substantial Completion.**
   a. Contractor will commence the Work on the date for commencement set forth in the Written Notice to proceed from Owner to Contractor.
   b. Contractor will achieve Substantial Completion and have the Work ready for Owner's inspection no later than _____ (_____) days from the date of commencement set forth in the Written Notice to proceed from Owner to Contractor, as adjusted in accordance with the Contract Documents.
   c. Time is of the essence.

5. **Contract Sum.**
   a. Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the Contract Sum in the amount of _____ Dollars ($_____), subject to additions and deductions as provided in the Contract Documents.
   b. Owner will make payments to Contractor in accordance with the Contract Documents.

6. **Independent Contractor Relationship.** Contractor is an independent contractor and is not the agent or employee of Owner.

7. **Assignment.** Neither party to this Agreement will assign any right or obligation hereunder without the prior written consent of the other, which consent may be granted or withheld in such party's absolute discretion.

Contractor will not assign moneys due or to become due to Contractor hereunder, nor will Contractor pledge the credit of Owner or bind Owner to any third party.

8. **Notice.** The parties designate the addresses, facsimile numbers, and email addresses as set forth in the signature blocks below to be used for sending Written Notice to the other party:

9. **Effective Date.** The effective date of this Agreement is the date indicated by the Owner's signature.

OWNER:	**CONTRACTOR:**
The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole	(company)
Signature:	Signature:
Print Name:	Print Name:
Title:	Title:
Address:	Address:
Telephone No:	Telephone No:
Facsimile No:	Facsimile No:
Email:	Email:
Effective Date:	Fed. I.D. or SSN:
	License No:
Reviewed By:	Date Signed:

GENERAL CONDITIONS
For a Fixed Sum (U.S.)

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SECTION 1 - GENERAL PROVISIONS

1.1 DEFINITIONS

A. Adverse Weather: weather conditions that are seasonally abnormal and could not have been reasonably anticipated.

B. Agreement: the document entitled "Agreement Between Owner and Contractor for a Fixed Sum (U.S.), executed by Owner and Contractor for performance of the Work.

C. Architect: the entity identified as such in the Agreement.

D. Change In The Work: a modification to the requirements of the Contract Documents or a delay in Substantial Completion resulting from an instruction from Owner or Architect to Contractor or from another event or circumstance.

E. Change Order: a written instrument prepared by Architect and signed by Owner, Contractor, and Architect stating their agreement upon the following: (1) the occurrence of a Change in the Work; (2) the amount of the adjustment, if any, in the Contract Sum as a result of the Change in the Work; and (3) the extent of the adjustment, if any, in the Contract Time as a result of the Change in the Work.

F. Construction Change Directive: a written order prepared by Architect and signed by Architect and Owner which: (1) orders a Change in the Work if the terms of a Change Order cannot be agreed upon prior to performance of a Change in the Work described in Section 7.1 or after occurrence of an event or circumstance described in Section 7.2; and (2) states a proposed basis for adjustment, if any, in the Contract Sum, the Contract Time, or both, resulting from the Change in the Work.

G. Contract Documents: the documents identified as such in the Agreement.

H. Contract Sum: the total amount set forth in the Agreement payable by Owner to Contractor for performance of the Work.

I. Contract Time: the period of time set forth in the Agreement for the Substantial Completion of the Work.

J. Contractor: the entity identified as such in the Agreement.

K. Day: calendar day unless otherwise specifically defined.

L. Direct Costs: actual costs for labor, materials, equipment, insurance, bonds, subcontract costs and onsite supervision relating to the Project. They do not include labor costs for project managers or other off-site administration.

M. Drawings: the documents identified as such in the Agreement.

N. Field Change: a written order prepared by Architect and signed by Architect and Contractor for a minor Change in the Work consistent with the general intent of the Contract Documents costing $1,000 or less, resulting in no time extension, and which is necessary to avoid delaying the Work.

O. Modification: a written amendment to the Contract Documents in the form of a:
1. Change Order;
2. Construction Change Directive; or
3. Field Change.

P. Owner: the entity identified as such in the Agreement.

Q. Project: the total construction designed by Architect of which the Work performed under the Contract Documents may be the whole or a part.

R. Product Data: standard illustrations, schedules, performance charts, instructions, brochures, diagrams, and other information furnished by Contractor to illustrate details regarding materials or equipment to be used in the Work, or the manner of installation, operation, or maintenance of such materials or equipment.

S. Project Manual: the document identified as such in the Agreement.

T. Samples And Mock-ups: physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.

U. Shop Drawings: drawings, diagrams, illustrations, schedules, performance charts, fabrication and installation drawings, setting diagrams, patterns, templates, and other data which illustrate some portion of the Work and confirm dimensions and conformance to the Contract Documents specially prepared by Contractor or any Subcontractor, manufacturer, supplier, or distributor.

V. Specifications: the documents identified as such in the Agreement.

W. Subcontractor: any entity supplying labor, materials, equipment, construction or services for the Work under separate contract with Contractor or any other Subcontractor.

X, Submittals: Shop Drawings, Product Data, Samples and Mock-ups and any other documents or items furnished by Contractor or its Subcontractors to Owner or Architect to demonstrate how any portion of the Work will be accomplished or the type of materials or products that will be used in the Work.

Y. Substantial Completion: Completion of the Work to a point where Owner can use the Work for its intended purposes. The date of Substantial Completion is the date certified as such by Architect in accordance with the Contract Documents.

Z. Work: all labor, materials, equipment, construction, and services required by the Contract Documents.

AA. Written Notice: notice in writing given from one party to the other at the addresses or facsimile numbers listed in the Agreement, or at such other addresses or facsimile numbers as the parties will designate from time to time by Written Notice, and will be effective at the earliest of:
1. The date of personal delivery to the other party with signed acknowledgment of receipt; or
2. The date sent by facsimile transmission to the other party provided receipt of the facsimile is verified by an electronic confirmation report by the party sending the facsimile transmission and further provided that a confirmation copy is sent to the other party by courier or by registered or certified mail within twenty-four (24) hours after the time and date of the facsimile transmission; or
3. The date of receipt by the other party as stated on the return receipt if sent by registered or certified mail, or by courier.

1.2 CORRELATION AND INTENT OF CONTRACT DOCUMENTS

A. The intent of the Contract Documents is to require Contractor to provide all labor, materials, equipment, construction, and services necessary for the proper execution and completion of the Work. The Contract Documents are complementary and what is required by any one will be as binding as if required by all. Contractor will perform the Work in accordance with the requirements expressly set forth in or reasonably inferable from the Contract Documents.

B. The organization of the Contract Documents is not intended to control Contractor in dividing the Work among Subcontractors or to establish the extent of the Work to be performed by any trade.

C. Words used in the Contract Documents that have well known technical or trade meanings are used therein in accordance with such recognized meanings.

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

1.3 OWNERSHIP AND USE OF CONTRACT DOCUMENTS

The Drawings, the Project Manual, and copies thereof are the property of Owner. Contractor will not use these documents on any other project. Contractor may retain one copy of the Drawings and the Project Manual as a contract record set and will return or destroy all remaining copies following final completion of the Work.

1.4 PUBLIC STATEMENTS REGARDING PROJECT

Contractor will not make any statements or provide any information to the media about the Project without the prior written consent of Owner. If Contractor receives any requests for information from media, Contractor will refer such requests to Owner.

1.5 OWNERSHIP AND USE OF RENDERINGS AND PHOTOGRAPHS

Renderings representing the Work are the property of Owner. All photographs of the Work, whether taken during performance of the

Work or at completion, are the property of the Owner. The Owner reserves all rights including copyrights to renderings and photographs of the Work. No renderings or photographs shall be used or distributed without written consent of the Owner

1.6 NO COMMERCIAL USE OF TRANSACTION OR RELATIONSHIP

Without the prior written consent of Owner, which Owner may grant or withhold in its sole discretion, neither Contractor nor Contractor's affiliates, officers, directors, agents, representatives, shareholders, members, Subcontractors, Sub-subcontractors or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:

A. By referring to this Agreement, Owner, or the Project verbally or in any sales, marketing or other literature, letters, client lists, press releases, brochures or other written materials except as may be necessary for Contractor to perform Contractor's obligations under the terms of this Agreement;

B. By using or allowing the use of any photographs of the Project or any part thereof, or of any service marks, trademarks or trade names or other intellectual property now or which may hereafter be associated with, owned by or licensed by Owner in connection with any service or product; or

C. By contracting with or receiving money or anything of value from any person or commercial entity to facilitate such person or entity obtaining any type of commercial identification, advertising or visibility in connection with the Project.

Notwithstanding the foregoing, Contractor may include a reference to Owner and the services and equipment provided under this Agreement in a professional résumé or other similar listing of Contractor's references without seeking Owner's written consent in each instance; provided, that such reference to Owner, the services and equipment is included with at least several other similar references and is given no more prominence than such other references.

1.7 CONFIDENTIALITY / PROPERTY RIGHTS

A. Owner will retain ownership and intellectual property rights in all plans, designs, drawings, documents, concepts, and materials provided by or on behalf of Owner to Contractor and to all work products of Contractor for or relative to Work performed under this Agreement, such products, services, and Work of Contractor constituting works made for hire. Contractor will not reuse any portions of such items provided by Owner or developed by Contractor for Owner pursuant to this Agreement, or disclose any such items to any third party without the prior written consent of Owner. Owner may withhold its consent in its' absolute discretion.

B. In addition, Contractor shall ensure that Contractor, Subcontractors, and the employees, agents and representatives of Contractor and its Subcontractors maintain in strict confidence, and shall use and disclose only as authorized by Owner all Confidential Information of Owner that Contractor receives in connection with the performance of this Agreement. Notwithstanding the foregoing, Contractor may use and disclose any information to the extent required by an order of any court or governmental authority, but only after it has notified Owner and Owner has had an opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of this Agreement, "Confidential Information" means:
   1. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
   2. Any information relating to contracts, agreements, business plans, budgets or other financial information of Owner to the extent such information has not been made available to the public by the Owner; and
   3. Any other information that is marked or noted as confidential by the Owner at the time of its disclosure.

1.8 COMPLY WITH INTELLECTUAL PROPERTY RIGHTS OF OTHERS

Contractor represents and warrants that no Work (with its means, methods, goods, and services attendant thereto), provided to Owner will infringe or violate any right of any third party and that Owner may use and exploit such Work, means, methods, goods, and services without liability or obligation to any person or entity (specifically and without limitation, such Work, means, methods, goods, and services will not violate rights under any patent, copyright, trademark, or other intellectual property right or application for the same).

SECTION 2 - OWNER

2.1 OWNER'S DESIGNATED REPRESENTATIVE

Owner will designate in writing a representative who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.

2.2 INFORMATION AND SERVICES REQUIRED OF OWNER

A. Owner will be responsible for establishment of property lines and benchmarks for grading.

B. Owner will furnish to Contractor any information or services it is required to furnish under the Contract Documents with reasonable promptness to avoid delay in the orderly progress of the Work.

C. Owner will furnish to Contractor a reasonable number of copies of the Drawings, the Project Manual, and the Addenda.

2.3 OWNER'S RIGHT TO INSPECT THE WORK

Owner and its representatives will have the right to inspect any portion of the Work wherever located at any time.

2.4 OWNER'S RIGHT TO STOP THE WORK

If Contractor fails to carry out the Work in accordance with the Contract Documents or fails to correct Work which is not in accordance with the Contract Documents in a timely manner, Owner may order Contractor in writing to stop the Work, or any portion thereof, until the cause for that order has been eliminated.

SECTION 3 - CONTRACTOR

3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

A. By executing the Agreement, Contractor represents that it has visited the Project site, familiarized itself with the local conditions under which the Work is to be performed, and correlated its own observations with the requirements of the Contract Documents.

B. Contractor will carefully review and compare the Contract Documents and any other available information relating to the Project prior to commencing and during performance of each portion of the Work and will immediately report to Architect any errors, inconsistencies, and omissions it discovers.

C. Should Contractor or any of its Subcontractors become aware of any question regarding the meaning or intent of any part of the Contract Documents prior to commencing that portion of the Work about which there is a question, Contractor will request an interpretation or clarification from Architect before proceeding. Contractor proceeds at its own risk if it proceeds with the Work without first making such a request and receiving an interpretation or clarification from Architect. If neither Contractor nor its Subcontractors become aware of the question until after work on the relevant portion of the Work has commenced, then the following precedence will govern for purposes of determining whether resolution of the question constitutes a Change in the Work:
   1. The Agreement takes precedence over all other Contract Documents.
   2. The Supplementary Conditions take precedence over the General Conditions.
   3. The General Conditions and Supplementary Conditions take precedence over the Drawings and the Specifications.
   4. An Addendum or a Modification takes precedence over the document(s) modified by the Addendum or Modification.
   5. The Specifications take precedence over the Drawings.
   6. Within the Drawings, larger scale drawings take precedence over smaller scale drawings, figured dimensions over scaled dimensions, and noted materials over graphic indications.

D. Contractor will give Architect notice of any additional drawings, specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work, sufficiently in advance of the need for information so as not to delay the Work.

E. It is not Contractor's responsibility to ascertain that the Contract Documents are in accordance with requirements of applicable laws, statutes, ordinances, building codes, rules and regulations. However, if Contractor observes that portions of the Contract Documents are at variance with those requirements, Contractor will immediately notify Architect in writing. Contractor will not proceed unless Owner and/or Architect effects Modifications to the Contract Documents required for compliance with such requirements. Contractor will be fully responsible for any work knowingly performed contrary to such requirements and will fully indemnify Owner against loss and bear all costs and penalties arising therefrom.

F. Contractor will take field measurements and verify field conditions and will compare such field measurements and conditions and other information known to Contractor with the Contract Documents before ordering any materials or commencing construction activities. Contractor will immediately report errors, inconsistencies, and omissions that it discovers to Architect. If Contractor orders materials or commences construction activities before taking field measurements and verifying field conditions, Contractor will not be entitled to any compensation for additional costs to Contractor resulting from field measurements or conditions different from those anticipated by Contractor which would have been avoided had Contractor taken field measurements and verified field conditions prior to ordering the materials or commencing construction activities.

G. If site conditions indicated in the Contract Documents or other information provided by Owner or Architect to Contractor differ materially from those Contractor encounters in performance of the Work, Contractor will immediately notify Architect in writing of such differing site conditions.

H. Where the Contract Documents require the Contractor to provide professional services for architecture or engineering, the Contractor shall cause such services to be performed by appropriately licensed professionals.

3.2 SUPERVISION OF CONSTRUCTION PROCEDURES

A. Contractor will supervise and direct the Work. Contractor will be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work. All loss, damage, liability, or cost of correcting defective work arising from the use of any construction means, methods, techniques, sequences or procedures will be borne by Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Contract Documents, unless Contractor has given timely notice to Owner and Architect in writing that such means, methods, techniques, sequences or procedures are not safe or suitable, and Owner has then instructed Contractor in writing to proceed at Owner’s risk.

B. Contractor will utilize its best skill, efforts, and judgment to provide efficient business administration and supervision, to furnish at all times an adequate supply of workers and materials, and to perform the Work in an expeditious and economical manner consistent with the interests of Owner.

C. Contractor will be responsible for:
   1. The proper observance of property lines and set back requirements as shown in the Contract Documents;
   2. The location and layout of the Work as shown in the Contract Documents with respect to the position of the Work on the property and the elevation of the Work in relation to grade; and
   3. Setting and maintaining construction stakes.

D. Contractor will be responsible to Owner for the acts and omissions of its employees and Subcontractors as well as persons either directly or indirectly employed by Subcontractors.

E. Contractor will not be relieved of its obligation to perform the Work in accordance with the Contract Documents as a result of any tests, inspections, or approvals by Owner, Architect or their consultants.

F. Contractor will be responsible for inspection of portions of the Work already completed to determine that such portions are in proper condition to receive subsequent portions of the Work.

G. Contractor recognizes that the Project site and the surrounding area is frequently visited by the public and is important to Owner's image and function and will maintain the premises free from debris and waste materials resulting from Construction. At the completion of Construction, Contractor shall promptly remove construction equipment, tools, surplus materials, waste materials and debris.

3.3 LABOR AND MATERIALS

A. Unless otherwise provided in the Contract Documents, Contractor will provide and pay for all labor, materials, equipment, tools, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

B. Contractor will at all times enforce strict discipline and good order among those performing the Work and will not permit employment of any unfit person or anyone not skilled in the tasks assigned to them.

C. Contractor is fully responsible for the Project and all materials and work connected therewith until Owner has accepted the Work in writing. Contractor will replace or repair at its own expense any materials or work damaged or stolen, regardless of whether it has received payment for such work or materials from the Owner.

D. Contractor will remedy all damage or loss to any property caused in whole or in part by Contractor, any Subcontractor, or by anyone for whose acts any of them may be liable.

E. Contractor will be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. Architect may require Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of Architect, would lead to a reasonable certainty that any material used, or proposed to be used, in the work meets the requirements of the Contract Documents. All such data will be furnished at Contractor's expense. This provision will not require Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at Contractor's expense.

F. Contractor will coordinate and supervise the work performed by Subcontractors so that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. Contractor and all Subcontractors will at all times afford each trade, any separate contractor, or Owner, reasonable opportunity for the installation of Work and the storage of materials.

G. Contractor warrants to Owner that the materials and equipment furnished for the Work will be new unless otherwise specified by the Contract Documents, and that the Work will be free from defects, and will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in the discretion of Owner. If required by Architect, Contractor will furnish satisfactory evidence as to the kind and quality of the materials and equipment used in performing the Work.

H. Owner may elect to purchase materials required for the Work. In that event, Contractor will comply with the procedures set forth in the Contract Documents relating to such materials.

3.4 COMPLIANCE WITH LAWS

Contractor will comply with all applicable laws, ordinances, rules, regulations, and orders of any public authorities relating to performance of the Work.

3.5 TAXES

A. Contractor will pay all sales, use, consumer, payroll, workers compensation, unemployment, old age pension, surtax, and similar taxes assessed in connection with the performance of the Work.

B. Owner will pay all taxes and assessments on the real property comprising the Project site.

3.6 PERMITS AND FEES

A. Owner will obtain and pay for all zoning and use permits and permanent easements necessary for completion of the Work.

B. Contractor will obtain and pay for the building permit, and all other permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work.

C. Contractor will secure any certificates of inspection and of occupancy required by authorities having jurisdiction over the Work. Contractor will deliver these certificates to Architect prior to issuance of the Certificate of Substantial Completion by Architect.

3.7 CONTRACTOR'S ON-SITE REPRESENTATIVE

Contractor will employ a competent representative acceptable to Owner to supervise the performance of the Work. This representative will be designated in writing by Contractor prior to commencement of work and will not be changed prior to final inspection of the Work without prior written consent of Owner. This representative will represent Contractor for all purposes, including communication with Owner.

3.8 CONTRACTOR'S CONSTRUCTION SCHEDULES

A. Contractor will prepare and submit for Owner's and Architect's information Contractor's construction schedule for the Work in accordance with the requirements of the Contract Documents.

B. Contractor will prepare and maintain a Submittal schedule which is coordinated with Contractor's construction schedule and sets forth specified times for Architect to review Submittals.

3.9 DOCUMENTS AND SUBMITTALS AT THE SITE

Contractor will keep at the Project site for use by Owner, Architect, or their representatives, a record copy of the Project Manual, the Drawings, all Addenda, and all Modifications. These documents will be maintained in good order and currently marked to record changes and selections made during construction. In addition, Contractor will keep at the Project site one copy of all Submittals.

3.10 SUBMITTALS

A. Submittals are not Contract Documents and do not alter the requirements of the Contract Documents unless incorporated into the Contract Documents by a Modification.

B. Contractor will review, approve, and submit to Architect Submittals in accordance with the Contract Documents. By approving Submittals, Contractor represents that it has determined and verified field measurements, field construction criteria, materials, catalog numbers, and similar data, and that it has checked and coordinated each Submittal with the requirements of the Work and of the Contract Documents or will make such determination, verification, check, and coordination prior to commencing the relevant portion of the Work. In reviewing Submittals Architect will be entitled to rely upon Contractor’s representation that such information is correct and accurate.

C. Contractor will inform Architect in writing at the time of submission of any Submittal or portion thereof which deviates from the requirements of the Contract Documents. Contractor will provide Architect with documentation demonstrating to Architect that the Submittal is equal to or better than the specified product or work. Contractor will not be relieved of responsibility for deviations from the requirements of the Contract Documents by Architect’s acceptance of a Submittal unless Contractor has informed Architect in writing of the deviation and Architect has incorporated the deviation into the Contract Documents by a Modification.

D. Contractor will not perform any portions of the Work requiring Submittals until the respective Submittal has been reviewed and accepted in writing by Architect.

E. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, Owner will be entitled to rely upon such certifications, and neither Owner nor Architect will be expected to make any independent examination with respect thereto.

F. Submittals not required by the Contract Documents may be returned to Contractor without action.

3.11 CUTTING AND PATCHING

Contractor will be responsible for any cutting, fitting, and patching that may be required to complete the Work and make its parts fit together properly.

3.12 ACCESS TO WORK

Contractor will permit Owner, Architect, their representatives and consultants, access to the Work wherever located at any time.

3.13 ROYALTIES AND PATENTS

Contractor will pay all royalties and license fees required by the Work or by Contractor's chosen method of performing the Work. Contractor will defend and hold Owner harmless from all suits or claims for infringement of any patent, license or other intellectual property rights or any loss on account thereof.

3.14 INDEMNIFICATION

A. Contractor will indemnify and hold harmless Owner and Owner's representatives, employees, agents, architects, and consultants from and against any and all claims, damages, liability, demands, costs, judgments, awards, settlements, causes of action, losses and expenses (collectively “Claims” or “Claim”), including but not limited to attorney fees, consultant fees, expert fees, copy costs, and other expenses, arising out of or resulting from performance of the Work, attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of real or personal property, including loss of use resulting therefrom, except to the extent that such liability arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity includes, without limitation, indemnification of Owner from all losses or injury to Owner’s property, except to the extent that such loss or injury arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity applies, without limitation, to include Claims occurring both during performance of the Work and/or subsequent to completion of the Work. In the event that any Claim is caused in part by a party indemnified hereunder, that party will bear the cost of such Claim to the extent it was the cause thereof. In the event that a claimant asserts a Claim for recovery against any party indemnified hereunder, the party indemnified hereunder may tender the defense of such Claim to Contractor. If Contractor rejects such tender of defense and it is later determined that the negligence of the party indemnified hereunder did not cause all of the Claim, Contractor will reimburse the party indemnified hereunder for all costs and expenses incurred by that party in defending against the Claim. Contractor will not be liable hereunder to indemnify any party for damages resulting from the sole negligence of that party.

B. In addition to the foregoing, Contractor will be liable to defend Owner in any lawsuit filed by any Subcontractor relating to the Project. Where liens have been filed against Owner's property, Contractor (and/or its bonding company which has issued bonds for the Project) will obtain lien releases and record them in the appropriate county and/or local jurisdiction and provide Owner with a title free and clear from any liens of Subcontractors. In the event that Contractor and/or its bonding company are unable to obtain a lien release, Owner in its absolute discretion may require Contractor to provide a bond around the lien or a bond to discharge the lien, at Contractor's sole expense.

C. In addition to the foregoing, Contractor will indemnify and hold Owner harmless from any claim of any other contractor resulting from the performance, nonperformance or delay in performance of the Work by Contractor.

D. The indemnification obligation herein will not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or a Subcontractor under worker's compensation acts, disability benefit acts, or other employee benefit acts.

3.15 PROJECT MEETINGS

Contractor will attend and participate in meetings as required by the Contract Documents.

SECTION 4 - ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

In the event that Owner terminates its contractual relationship with Architect, Owner will appoint in writing another architect, whose status under the Contract Documents will be that of the former Architect in all respects.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

A. Architect will make periodic visits to the site to familiarize itself generally with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents. Although Architect is required to make periodic inspections, it is not required to make exhaustive or continuous onsite inspections. On the basis of its observations while at the site, Architect will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defects and deficiencies in the Work. Architect’s failure to observe a defect or deficiency in the Work will not relieve Contractor of its duty to perform the Work in accordance with the Contract Documents.

B. Architect will review Contractor's payment requests and determine the amounts due Contractor in accordance with Section 9.

C. Communications between Contractor and Owner relating to the Work will be through Architect. Communications between Owner or Contractor with Architect’s consultants relating to the Work will be through Architect. Communications between Owner or Architect and subcontractors relating to the Work will be through Contractor. Communications between Contractor and any separate contractor will be through Architect, except as otherwise specified in the Contract Documents.

D. Owner and/or Architect will have the right to reject and require removal of the following at Contractor's expense:
   1. Any portion of the Work that does not meet the requirements of the Contract Documents.
   2. Any portion of the Work damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection.

E. Architect will have authority to suspend the Work, with concurrence of Owner, whenever such suspension may be necessary in its reasonable opinion to insure the proper performance of the Work.

F. Architect will review Contractor’s Submittals and will accept or take other appropriate action regarding the Submittals. Architect's review of the Submittals will be for the limited purpose of checking for general conformance with the Contract Documents and will not be conducted for the purpose of determining the accuracy and completeness of details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which

remain the responsibility of Contractor. Architect's review of Submittals will not relieve Contractor of its obligations under the Contract Documents. Architect's review of Submittals will not constitute acceptance of safety precautions or construction means, methods, techniques, sequences or procedures. Architect's acceptance of a specific item will not indicate acceptance of an assembly of which the item is a component.

G. Architect has authority to order Construction Change Directives and Field Changes in accordance with Section 7.

H. Architect will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and review written guarantees and related documents required by the Contract and assembled by Contractor, and will review and certify or reject Contractor's final payment request.

I. Architect will be the interpreter of the performance and requirements of the Contract Documents. Architect's interpretations will be in writing or in the form of drawings.

J. Architect's decisions in matters relating to aesthetic effect will be final if consistent with the Contract Documents and approved by Owner.

SECTION 5 - SUBCONTRACTORS

5.1 AWARD OF SUBCONTRACTS FOR PORTIONS OF THE WORK

A. Contractor will enter into contracts with Subcontractors to perform all portions of the Work that Contractor does not customarily perform with its own employees.

B. Contractor will not contract with any Subcontractor who has been rejected by Owner. Contractor will not be required to contract with any Subcontractor against whom it has a reasonable objection.

C. If Owner rejects any Subcontractor proposed by Contractor, Contractor will propose an acceptable substitute to whom Owner has no reasonable objection.

D. Contractor will not make any substitution for any Subcontractor that has been accepted by Owner and Architect without the prior written approval of Owner and Architect.

5.2 SUBCONTRACTUAL RELATIONS

A. Contractor's responsibility for the Work includes the labor and materials of all Subcontractors, including those recommended or approved by Owner. Contractor will be responsible to Owner for proper completion and guarantee of all workmanship and materials under any subcontracts. Any warranties required for such work will be obtained by Contractor in favor of Owner and delivered to Architect. It is expressly understood and agreed that there is no contractual relationship between Owner and any Subcontractor, and under no circumstances will Owner be responsible for the non-performance or financial failure of any Subcontractor or any effects therefrom.

B. Contractor agrees to pay the Subcontractors promptly upon receipt of payment from Owner for that portion of the funds received which represents the Subcontractor's portion of the Work completed to Contractor's satisfaction for which Owner has made payment.

C. Contractor will require each Subcontractor to:
1. Be licensed by the state in which the Project is located where such licensing is required by the governing authority;
2. Be bound by the terms of the Contract Documents as far as they are applicable to the Subcontractor's work;
3. Assume toward Contractor the same obligations Contractor has assumed toward Owner, including the prompt payment of its Subcontractors;
4. Submit its applications for payment to Contractor in time to permit Contractor to make timely application to Owner;
5. Execute claim or lien releases or lien waivers for payments made by Contractor; and
6. Make all claims for Changes in the Work to Contractor in the same manner as Contractor is required to make such claims to Owner.

SECTION 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK OR AWARD SEPARATE CONTRACTS

A. Owner reserves the right to perform work itself or to award separate contracts in connection with the Project.

B. When separate contracts are awarded, "Contractor" in the Contract Documents in each case will mean the contractor who signs each separate contract.

6.2 MUTUAL RESPONSIBILITY

A. Contractor will afford other contractors reasonable opportunity to place and store their materials and equipment on site and to perform their work and will properly connect and coordinate its Work with theirs where applicable.

B. If any part of Contractor's Work depends upon the work of any separate contractor for proper performance or results, Contractor will inspect and promptly report to Architect any apparent discrepancies or defects in such work that render it unsuitable for proper performance and results. Failure of Contractor to so inspect and report will constitute an acceptance of the work of the separate contractor as fit and proper to receive Contractor's Work, except as to defects not then reasonably discoverable.

C. Contractor will promptly remedy damage caused by Contractor or any Subcontractor to the completed or partially completed work of other contractors or to the property of Owner or other contractors.

6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among Contractor and separate contractors as to the responsibility under their separate contracts for maintaining the Project free from waste materials and rubbish, Owner may clean the Project, allocate the cost among those responsible as Owner and Architect determine to be just, and withhold such cost from any amounts due or to become due to Contractor.

SECTION 7 - CHANGES IN THE WORK

7.1 CHANGES IN THE WORK RESULTING FROM AN INSTRUCTION BY OWNER OR ARCHITECT TO CONTRACTOR

A. If Owner or Architect gives Contractor an instruction that modifies the requirements of the Contract Documents or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If compliance with the instruction affects the cost to Contractor to perform the Work, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in cost subject to the conditions set forth in Section 7.1, Paragraphs B through G. If compliance with the instruction delays Substantial Completion, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in Section 7.1, Paragraphs B through G and Section 7.3, Paragraph A and Contractor will be paid liquidated damages for the delay as set forth in Section 7.3, Paragraph B.

B. If Contractor receives an instruction from Owner or Architect that Contractor considers to be a Change in the Work, Contractor, before complying with the instruction, will notify Architect in writing that Contractor considers such instruction to constitute a Change in the Work. If Architect agrees that compliance with the instruction will constitute a Change in the Work, Contractor will furnish a proposal for a Modification in accordance with Section 7.1, Paragraphs C. and D. within ten (10) days.

C. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) as a result of an instruction by Owner or Architect, Contractor will furnish a proposal for a Change Order containing a price breakdown itemized as required by Owner. The breakdown will be in sufficient detail to allow Owner to determine any increase or decrease in Direct Costs as a result of compliance with the instruction. Any amount claimed for subcontracts will be supported by a similar price breakdown and will itemize the Subcontractor's profit and overhead charges. Profit and overhead will be subject to the following limitations:
   1. The Subcontractor's profit and overhead will not exceed ten (10) percent of its Direct Costs on work performed. Subcontractor's profit and overhead will not exceed five (5) percent on work performed by its sub-subcontractors.
   2. Contractor's profit and overhead on work performed by its own crews will not exceed ten (10) percent of its Direct Costs.
   3. Contractor's profit and overhead mark up on work performed by its Subcontractors will not exceed five (5) percent of the Subcontractors' charges for such work.
   4. Amounts due Owner as a result of a credit change will be the actual net savings to Contractor from the Change in the Work as confirmed by Architect. On credit changes, profit and overhead on the originally estimated work will not be credited back to Owner. If both additions and credits are involved in a single Change in the Work, overhead and profit will be figured on the basis of net increase, if any, related to that Change in the Work.

D. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an instruction from Owner or Architect, Contractor will include in its proposal justification to support Contractor's claim that compliance with the instruction will delay Substantial Completion.

E. Upon receipt of Contractor's proposal for Modification, Architect and Owner will determine whether to proceed with the Change in the Work. If Architect and Owner determine to proceed with the Change in the Work, they will issue a Change Order, a Construction Change Directive or a Field Change as appropriate.

F. Contractor agrees that if it complies with an instruction from Owner or Architect without first giving written notice to Architect as provided in Section 7.1., Paragraph B, and receiving a Change Order, Construction Change Directive or Field Change, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.

G. If Contractor is instructed to perform work which it claims constitutes a Change in the Work but which Owner and Architect do not agree constitutes a Change in the Work, Contractor will comply with the instruction. Contractor may submit its claim for adjustment to the Contract Sum, the Contract Time, or both as a dispute pursuant to Section 13 within thirty (30) days after compliance with the instruction. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days after compliance with the instruction, then Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.

H. Contractor agrees that it is responsible for submitting accurate cost and pricing data to support its Change Order Proposals. Owner will have the right to examine the Contractor's records to verify the accuracy and appropriateness of the pricing data used to price change order proposals.

7.2 CHANGE IN THE WORK RESULTING FROM AN EVENT OR CIRCUMSTANCE

A. If an event or circumstance other than an instruction from Owner or Architect affects the cost to Contractor of performing the Work or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If the circumstance or event affects the cost to Contractor to perform the Work and is caused by a willful or negligent act or omission of Owner or Architect, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in Contractor's cost to perform the Work resulting from the event or circumstance, subject to the conditions set forth in Section 7.2, Paragraphs B through F. If the event or circumstance delays Substantial Completion and is described in Section 7.3, Paragraph A, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in such section. If the circumstance or event delays Substantial Completion and is caused by a willful or negligent act or omission of Owner or Architect, then Contractor will be compensated for costs incident to the delay in accordance with Section 7.3, Paragraph B. Contractor will not be entitled to any adjustment to the Contract Sum or other damages from Owner as a result of any event or circumstance unless the event or circumstance results from a willful or negligent act or omission of Owner or Architect.

B. If a Change in the Work results from any event or circumstance caused by the willful or negligent act or omission of Owner or Architect, Contractor will give Owner Written Notice of such event or circumstance within twenty-four (24) hours after commencement of the event or circumstance so that Owner can take such action as is necessary to mitigate the effect of the event or circumstance. Contractor will not be entitled to any adjustment in either the Contract Time or the Contract Sum based on any damages or delays resulting from such event or circumstance during a period more than twenty-four (24) hours prior to Contractor giving such Written Notice to Owner.

C. Contractor will submit in writing any claims for an adjustment in the Contract Time and/or the Contract Sum resulting from an event or circumstance within the time limits set forth below. In the event that Contractor fails to submit its claim in writing within the time limits set forth below, then Contractor agrees it will not be entitled to any adjustment in the Contract Time or the Contract Sum or to any other damages from Owner due to the circumstance or event and waives any claim therefor.
   1. Claims for an adjustment in the Contract Time due to Adverse Weather will be made by the tenth (10th) of the month following the month in which the delay occurred.
   2. Claims for an adjustment in the Contract Time and/or the Contract Sum due to any other circumstance or event will be submitted within seven (7) days after the occurrence of the circumstance or event.

D. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) because of an event or circumstance resulting from the willful or negligent act or omission of Owner or Architect, Contractor will furnish a proposal for a Change Order containing a price breakdown as described in Section 7.1, Paragraph C. Any amount claimed for increased labor costs as a result of the event or circumstance must be supported by a certified payroll. Any claim for rented equipment or additional material costs must be supported by invoices.

E. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an event or circumstance, Contractor will include with its claim copies of daily logs, letters, shipping orders, delivery tickets, Project schedules, and other supporting information necessary to justify Contractor's claim that the event or circumstance delayed Substantial Completion. If Contractor is entitled to an adjustment in the Contract Time as a result of an event or circumstance caused by the wilful or negligent act or omission of Owner or Architect, Contractor will be compensated for all costs related to the delay in accordance with Section 7.3, Paragraph B.

F. Within thirty (30) days after receipt of Contractor's claim, Architect will either deny the claim or recommend approval to Owner. If Owner approves the claim, the adjustment in the Contract Time and/or Contract Sum will be reflected in a Change Order pursuant to Section 7.5 or a Construction Change Directive pursuant to Section 7.6. If Owner or Architect denies Contractor's claim, Contractor may submit its claim as a dispute pursuant to Section 13 within thirty (30) days of receipt of the denial of the claim. If Contractor fails to submit its claim for resolution pursuant to Section 13 within the thirty (30) day time period, then Contractor agrees it is not entitled to any adjustment in the Contract Time and/ or Contract Sum or any other damages as a result of the event or circumstance and waives any claim therefor.

7.3 EXTENSIONS OF TIME

A. If Substantial Completion of the Project is delayed because of any of the following causes, then the Contract Time will be extended by Change Order for a period of time equal to such delay:
   1. Labor strikes or lock-outs;
   2. Adverse weather;
   3. Unusual delay in transportation;
   4. Unforeseen governmental requests or requirements;
   5. A Change in the Work resulting from an instruction by Owner or Architect to Contractor subject to the conditions set forth in Section 7.1; or
   6. Any other event or circumstance caused by the willful or negligent act or omission of Owner or Architect.

B. Contractor will not be entitled to any compensation for delay described in Section 7.3, Paragraph A, subparagraphs 1, 2, 3 and 4. For each day of delay in Substantial Completion described in Section 7.3, Paragraph A, subparagraphs 5 and 6, Contractor will be paid liquidated damages in the amount per day set forth in the Supplementary Conditions to compensate Contractor for all damages resulting from any delay including but not limited to damages for general conditions costs, additional job site costs, additional home office overhead costs, disruption costs, acceleration costs, increase in labor costs, increase in subcontract costs, increase in materials costs, and any other costs incident to the delay. Contractor will be entitled to no other compensation relating to the delay.

C. In no event will any time extension or cost adjustment be given on account of delay which reasonably should have been anticipated by the Contractor or in circumstances where performance of the Work is, was, or would have been, delayed by any other cause for which the Contractor is not entitled to an extension.

7.4 DOCUMENTATION OF CHANGES IN THE WORK

Every Change in the Work will be documented by a Change Order, a Construction Change Directive or a Field Change. If Owner, Architect and Contractor reach agreement regarding the adjustment in the Contract Sum, if any, and the adjustment in the Contract Time, if any, resulting from a Change in the Work, then the parties will execute a Change Order pursuant to Section 7.5. If Owner, Architect and Contractor cannot reach agreement regarding the adjustment in Contract Sum or the adjustment in Contract Time resulting from a Change in the Work, then Owner and Architect will issue a Construction Change Directive pursuant to Section 7.6. Field Changes require the agreement of Architect and Contractor only.

7.5 CHANGE ORDERS

Contractor's signature upon a Change Order is Contractor's acknowledgment that it is not entitled to any additional adjustment in the Contract Sum or the Contract Time or any other damages or compensation as a result of the Change in the Work other than that provided for in the Change Order, irrespective of whether a subsequent claim for additional compensation or time extensions relating to the Change in the Work is described as a change in the requirements of the Contract Documents, a delay, a disruption of the Work, an acceleration of the Work, an impact on the efficiency of performance of the Work, an equitable adjustment, or other claim and irrespective of whether the impact of the Change in the Work is considered singly or in conjunction with the impact of other Changes in the Work.

7.6 CONSTRUCTION CHANGE DIRECTIVES

A. Contractor will promptly comply with all Construction Change Directives.

B. Pending final resolution of any adjustment in the Contract Sum or Contract Time relating to a Construction Change Directive, the amounts proposed by Owner in the Construction Change Directive may be included in Contractor's payment requests once the work relating thereto is completed.

C. If after the work described in the Construction Change Directive is completed, Owner, Architect, and Contractor reach agreement on adjustments in the Contract Sum, Contract Time, or both, such agreement will be reflected in an appropriate Change Order.

D. If the parties do not reach agreement regarding an adjustment to the Contract Sum, Contract Time, or both relating to the Construction Change Directive within thirty (30) days of the completion of the work described therein, then Contractor may submit its claim for an adjustment pursuant to Section 13 within thirty (30) days of the completion of such work. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days of completion of the work described in the Construction Change Directive, then it will not be entitled to an adjustment in Contract Sum or Contract Time resulting from such work except as set forth in the Construction Change Directive and waives any claim therefor.

7.7 FIELD CHANGES

Architect and Contractor will sign a Field Change order listing the Change In The Work and the Contract Sum including markups before Contractor proceeds with the Field Change.

7.8 WAIVER OF CLAIMS

Except as set forth in Section 7, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time or for any damages of any kind whatsoever resulting from an instruction from Owner or Architect, any event or circumstance, or any act or omission of Owner or Architect and Contractor expressly waives any and all claims therefor.

SECTION 8 - TIME

8.1 TIME IS OF THE ESSENCE

All time limits stated in the Contract Documents are of the essence. By executing the Agreement, Contractor confirms that the Contract Time is a reasonable period for performing the Work. Contractor will proceed expeditiously with adequate resources and will achieve Substantial Completion within the Contract Time.

8.2 COMMENCEMENT OF THE WORK

Contractor will not commence work on the Project site until the date set forth in the Written Notice to proceed. However, Contractor may enter into subcontracts and secure material for the Project after receipt of the Agreement with Owner's authorized signature. Owner will issue the Written Notice to proceed within forty-five (45) days after Owner receives acceptable bonds and evidence of insurance pursuant to Section 11 unless Owner earlier terminates the Agreement pursuant to Section 14.

8.3 DELAY IN COMPLETION OF THE WORK

A. For each day after the expiration of the Contract Time that Contractor has not achieved Substantial Completion, Contractor will pay Owner the amount set forth in the Supplementary Conditions as liquidated damages for Owner's loss of use of the Project

and the added administrative expense to Owner to administer the Project during the period of delay. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay. Owner may deduct any liquidated damages or reimbursable expenses from any money due or to become due to Contractor. If the amount of liquidated damages and reimbursable expenses exceeds any amounts due to Contractor, Contractor will pay the difference to Owner within ten (10) days after receipt of a written request from Owner for payment.

B. At the time Architect certifies that Contractor has achieved Substantial Completion, Architect will identify the remaining items to be completed for final completion of the Work and will establish with Contractor a reasonable time for completion of those items. Architect will set forth the items to be completed and the time established for their completion in a Certificate of Substantial Completion. For each day that Contractor exceeds the time allowed for completion of the items set forth in the Certificate of Substantial Completion, Contractor will pay to Owner as liquidated damages for additional administrative expenses the amount set forth in the Supplementary Conditions. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay in completing such items.

SECTION 9 - PAYMENTS AND COMPLETION

9.1 SCHEDULE OF VALUES

Contractor will submit to Architect a schedule of values which allocates the Contract Sum to various portions of the Work. The schedule of values will be supported by such data to substantiate its accuracy as required by Architect. This schedule, when accepted by Owner and Architect, will be used as a basis for reviewing Contractor's payment requests.

9.2 PAYMENT REQUESTS

A. Not more than once a month, Contractor will submit a payment request to Architect for Work completed, materials stored on the site, and for materials stored offsite as of the date of the payment request. The amount of the payment request will be based upon the schedule of values and will be equal to the value of the Work completed:
   1. Less retention;
   2. Less all prior amounts paid by Owner to Contractor as part of the Contract Sum; and
   3. Less allowable offsets.

   The payment request may include Changes in the Work that have been performed by Contractor and authorized by Owner and/or Architect pursuant to Section 7. If a payment request includes materials stored offsite, Contractor will include with the payment request a list of the materials, the location where they are stored and the written request of Contractor and its performance bond surety that payment be made for such materials.

B. Contractor warrants and guarantees that upon the receipt of payment for materials and equipment, whether incorporated in the Project or not, title to such materials and equipment will pass to Owner free and clear of all liens, claims, security interests, or encumbrances. Notwithstanding this payment and passage of title, Contractor will remain responsible for all such materials and equipment until actual delivery to the project site, incorporation into the Work, and final acceptance by Owner. Contractor further warrants that no material or equipment covered by a payment request is subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or any other person or entity.

9.3 PAYMENT REQUEST CERTIFICATION

A. Architect will, within seven (7) days after receipt of Contractor's payment request, forward to Owner the payment request certified for such amount as Architect determines is properly due. If Architect certifies less than the full amount of the payment request, Architect will notify Contractor and Owner of Architect's reasons for withholding certification of the full amount requested.

B. The certification of the payment request will constitute a representation by Architect to Owner based upon Architect's observations at the site and the data comprising the payment request, that the Work has progressed to the point indicated and that, to the best of Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by Architect. However, the certification of the payment request will not constitute a representation that Architect has:
   1. Conducted exhaustive or continuous on-site inspections to check the quantity or quality of the Work;
   2. Reviewed construction means, methods, techniques, sequences, or procedures;
   3. Reviewed copies of requisitions received from Subcontractors or other data requested by Owner to substantiate Contractor's right to payment; or
   4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.

C. In taking action on Contractor’s payment request, Owner will be entitled to rely on the accuracy and completeness of the information furnished by Contractor.

9.4 DECISIONS TO WITHHOLD CERTIFICATION AND PAYMENT

A. Architect may withhold certification of a payment request in whole or in part to the extent reasonably necessary to protect Owner if, in the opinion of Architect, the representations to Owner required by Section 9.3, Paragraph B cannot be accurately made. If

Architect is unable to certify payment in the amount of the payment request, Architect will notify Contractor and Owner as provided in Section 9.3, Paragraph A. If Contractor and Architect cannot agree on a revised amount, Architect will promptly certify a payment request for the amount for which Architect is able to make such representations to Owner. Architect may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a payment request previously certified, to such extent as may be necessary in Architect's opinion to protect Owner from loss because of:

1. Defective work not remedied;
2. Third-party claims filed or reasonable evidence indicating probable filing of such claims;
3. Failure of Contractor to make payments properly to Subcontractors for labor, materials, equipment, construction or services;
4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
5. Damage to Owner or another contractor for which Contractor is responsible;
6. Reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance will not be adequate to cover the cost of completing the Work and damages for the anticipated delay; or
7. Contractor's persistent failure to carry out the Work in accordance with the Contract Documents.

B. Owner reserves the right to withhold payments to Contractor, subsequent to Architect's certification of any payment request, in order to protect Owner from loss due to any condition described in Section 9.4, Paragraph A, Subparagraphs 1 through 7. Upon satisfactory resolution of any such conditions, payments so withheld will be made.

9.5 PROGRESS PAYMENTS

A. Owner will pay Contractor progress payments within the parameters of Section 9.2 within fifteen (15) days after Owner receives the certified payment request from Architect.

B. Owner will make payments to Contractor by either placing the payments in the mail addressed to Contractor or by electronic transfer at Owner’s discretion.

C. Upon receipt of any payment from Owner, Contractor will pay to each Subcontractor the amount paid to Contractor on account of such Subcontractor's portion of the Work.

D. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.

E. No payment made under the Contract Documents, either in whole or in part, will be construed to be an acceptance of defective or improper materials or workmanship.

F. In addition and notwithstanding the foregoing, Owner will also withhold and retain 10% of payments made to Contractor.

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within forty-five (45) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner’s form entitled “Contractor’s Substantial Completion Affidavit and Consent of Surety” fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

9.6 FINAL PAYMENT

A. Owner will make full and final payment of the Contract Sum within thirty (30) days of the completion of all of the following requirements:

1. Contractor has submitted its final payment request;
2. Architect has declared to Owner in writing that the Work is complete;
3. Contractor has obtained waiver and release upon final payment documents executed by all of the subcontractors performing work and/or providing materials covered by the Contractor’s final payment request; and
4. Contractor has collected and provided to Owner all manufacturers’ and other guaranties and warranties, properly signed and endorsed to Owner, that are required by the Contract Documents that extend for a period beyond one year after substantial completion. (Delivery of such guaranties and warranties will not relieve Contractor for any obligation assumed under any other provision of the Contract Documents.).

B. Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made in writing pursuant to Section 7 and identified by Contractor in its affidavit as still pending.

C. If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

SECTION 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

Contractor will be responsible to Owner for initiating and supervising all safety programs in connection with the performance of the Work.

10.2 SAFETY OF PERSONS AND PROPERTY

A. Contractor will take reasonable precautions to prevent damage, injury, or loss to:

1. All persons on the site;
2. The Work and materials and equipment to be incorporated into the Work; and
3. Other property at the site or adjacent to it.

B. Contractor will give notices and comply with applicable laws, ordinances, rules, regulations, and other lawful requirements of public authorities bearing on the safety or protection of persons and property. No work will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.

C. Contractor will designate a responsible member of its organization at the site whose duty will be the prevention of accidents. This person will be Contractor's onsite representative unless otherwise designated in writing by Contractor to Owner and Architect.

10.3 EMERGENCIES

In case of an emergency endangering life or threatening the safety of any person or property, Contractor may, without waiting for specific authorization from Architect or Owner, act at its own discretion to safeguard persons or property. Contractor will immediately notify Architect of such emergency action and make a full written report to Architect within five (5) days after the event.

10.4 HAZARDOUS MATERIALS

In the event the Contractor encounters on the site material reasonably believed to be hazardous materials which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Architect in writing. The Work in the affected area shall be resumed in the absence of hazardous materials, or when it has been rendered harmless, by written agreement of the Owner and Contractor.

SECTION 11 - INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

A. Contractor will obtain the following insurance and provide evidence thereof as described below prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier:
1. Workers Compensation Insurance.
2. Employers Liability Insurance with minimum limits of the greater of $500,000 E.L. each accident, $500,000 E. L. disease-each employee, $500,000 E.L. disease-policy limit or as required by the law of the state in which the Project is located.

3. Commercial General Liability Insurance – ISO Form CG 00 01 (12/07) or equivalent Occurrence policy which will provide primary coverage to the additional insureds (the Owner and the Architect) in the event of any Occurrence, Claim, or Suit with:
   a. Limits of the greater of Contractor's actual coverage amounts or the following:
      1) $2,000,000 General Aggregate;
      2) $2,000,000 Products - Comp/Ops Aggregate:
      3) $1,000,000 Personal and Advertising Liability:
      4) $1,000,000 Each Occurrence;
      5) $50,000 Fire Damage to Rented Premises (Each Occurrence).
   b. Endorsements attached to the General Liability policy including the following or their equivalent:
      1) ISO Form CG 25 03 (05/09), Amendment of Limits of Insurance (Designated Project or Premises), describing the Agreement and specifying limits as shown above.
      2) ISO Form CG 20 10 (07/04), Additional Insured -- Owners, Lessees, Or Contractors (Form B), naming Owner and Architect as additional insureds.
4. Automobile Liability Insurance, with:
   a. Combined Single Limit each accident in the amount of $1,000,000 or Contractor's actual coverage, whichever is greater; and
   b. Coverage applying to "Any Auto."

B. Contractor will provide evidence of such insurance to Owner as follows:
1. Deliver to Owner a Certificate of Liability Insurance, on ACORD 25 (2010/05) Form, or equivalent:
   a. Listing Owner and its consultants as the Certificate Holders and Additional Insured on the general liability and any excess liability policies;
   b. Attaching the ISO or equivalent endorsements set forth above to the Certificate of Liability Insurance;
   c. Identifying the Project;
   d. Listing the insurance companies providing coverage (All companies listed must be rated in A.M. Best Company Key Rating Guide-Property-Casualty and each company must have a rating of B+ Class VII or better. Companies which are not rated are not acceptable); and
   e. Bearing the name, address and telephone number of the producer and signed by an authorized representative of the producer. The signature may be original, stamped, or electronic.

C. Contractor will maintain, from commencement of the Work, Insurance coverage required herein as follows:
1. Commercial General Liability Insurance through expiration of warranty period specified in Section 12.2, Paragraph B. including completion of any warranty repairs; and
2. All other insurance through Final Payment.

D. Owner reserves the right to reject any insurance company, policy, endorsement, or certificate of insurance with or without cause.

E. Owner may, in writing and at its sole discretion, modify the insurance requirements.

F. The cost of insurance as required above will be the obligation of Contractor. Contractor will be responsible for payment of all deductible amounts under all insurance.

G. Owner will provide builders risk insurance for the cost of the Project. The policy will be written on an all risk basis with coverage for perils of wind, flood, earthquake, and terrorism, with exclusions standard for the insurance industry. The policy will be subject to a $5,000 deductible per occurrence which will be the responsibility of Contractor and will not be a reimbursable expense. Owner will provide a copy of the terms and conditions of the builders risk policy to Contractor upon Contractor's request. Contractor will comply with terms, conditions, and deadlines of the builders risk policy. The terms, conditions, and deadlines of the builders risk policy shall govern coverage. In addition, when there is a loss which may be covered by the builders risk insurance policy, Contractor will comply with the following:
   1. Contractor will report the loss immediately to builders risk commercial insurer by calling 1-866-537-7475 and shall make such further written submissions as required and otherwise comply with all requirements of the builders risk policy.
   2. Contractor will report the loss immediately to the Owner.
   3. Contractor will immediately notify its general liability insurance carrier of the loss.
   4. Contractor will take all necessary and appropriate actions to protect the property and individuals from further loss, harm, and injury. In the event there are damages resulting from fire or water, restoration shall be performed only by a certified restoration contractor.
   5. To the extent possible, Contractor will preserve and not disturb the evidence of the loss until after the builders risk commercial insurer and all interested parties and their insurance carriers have had the opportunity to view and investigate the site and loss.
   6. Contractor will cooperate with Owner and the builders risk commercial insurer in the investigation, documentation, and settlement of loss claims, including without limitation promptly responding to all requests for information and documentation from the builders risk commercial insurer and/or Owner.

11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

A. Prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier, Contractor will furnish to Owner a performance bond and a labor and material payment bond each in an amount equal to one hundred percent (100%) of the Contract Sum as security for all obligations arising under the Contract Documents. Such bonds will:
   1. Be written on Form AIA Document A312 (1984).
   2. Be issued by a surety company or companies licensed in the state in which the Project is located and holding valid certificates of authority under Sections 9304 to 9308, Title 31, of the United States Code as acceptable sureties or reinsurance companies on federal bonds.
   3. Have a penal sum obligation not exceeding the authorization shown in the current revision of Circular #570 as issued by the United States Treasury Department, i.e. "Treasury List".
   4. Be accompanied by a certified copy of the power of attorney stating the authority of the attorney-in-fact executing the bonds on behalf of the surety.

B. Owner reserves the right to reject any surety company, performance bond, or labor and material payment bond with or without cause.

C. The cost of the bonds as required above will be the obligation of Contractor.

SECTION 12 - UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

Contractor will notify Architect at least twenty-four (24) hours in advance of performing work that would cover up work or otherwise make it difficult to perform inspections required by the Specifications or by applicable governing authorities. Should any such work be covered without proper notification having been given to Architect, Contractor will uncover that work for inspection at its own expense.

12.2 CORRECTION OF WORK

A. Contractor will promptly correct any portion of the Work that is rejected by Architect or which fails to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor will bear the cost of correcting such rejected Work, including additional testing and inspection costs, compensation for Architect's services, and any other expenses made necessary thereby.

B. Contractor will remedy any defects due to faulty materials, equipment, or workmanship which appear within a period of one (1) year from the date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents. Contractor will pay all costs of correcting faulty work, including without limitation additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses when incurred.

C. Nothing in the Contract Documents will be construed to establish a period of limitation within which Owner may enforce the obligation of Contractor to comply with the Contract Documents. The one-year period specified above has no relationship to the time within which compliance with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations.

12.3 ACCEPTANCE OF NONCONFORMING WORK

A. If Owner prefers to accept any portion of the Work not in conformance with the Contract Documents, Owner may do so instead of requiring removal and correction of the nonconforming Work. In that event, the Contract Sum will be reduced by an amount agreed upon by the parties that reflects the difference in value to Owner between the Work as specified and the nonconforming Work. Such adjustment may consider increased maintenance costs, early replacement costs, increased inefficiency of use, and the like and will be effective whether or not final payment has been made. Such adjustment will be reflected in a Change Order pursuant to Section 7.5.

B. Temporary or trial usage by Owner or Architect of mechanical devices, machinery, apparatus, equipment, or other work or materials supplied under the Contract Documents prior to written acceptance by Architect, will not constitute Owner's acceptance.

SECTION 13 - RESOLUTION OF DISPUTES

13.1 SUBMITTAL OF DISPUTE

In the event there is any dispute arising under this Agreement which cannot be resolved by agreement between the parties, either party may submit the dispute with all documentation upon which it relies to the Director of Architecture, Engineering, and Construction, Meetinghouse Facilities Department, 50 East North Temple, Salt Lake City, Utah 84150, who will convene a dispute resolution conference within thirty (30) days. The dispute resolution conference will constitute settlement negotiations and any settlement proposal made pursuant to the conference will not be admissible as evidence of liability. In the event that the parties do not resolve their dispute pursuant to the dispute resolution conference, either party may commence legal action to resolve the dispute. Any such action must be commenced within six (6) months from the first day of the dispute resolution conference or be time barred. Submission of the dispute to the Director as outlined above is a condition precedent to the right to commence legal action to resolve any dispute. In the event that either party commences legal action to adjudicate any dispute without first submitting the dispute to the Director, the other party will be entitled to obtain an order dismissing the litigation without prejudice and awarding such other party any costs and attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert and consultant fees and expenses.

13.2 CONTRACTOR TO PROCEED WITH DILIGENCE

Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations under this Agreement.

SECTION 14 - TERMINATION

14.1 TERMINATION BY CONTRACTOR

In the event Owner materially breaches any term of the Contract Documents, Contractor will promptly give Written Notice of the breach to Owner. If Owner fails to cure the breach within ten (10) days of the Written Notice, Contractor may terminate the Agreement by giving Written Notice to Owner and recover from Owner the percentage of the Contract Sum represented by the Work completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation or damages as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor’s indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

14.2 TERMINATION BY OWNER FOR CAUSE

Should Contractor fail to provide Owner with the bonds and certificates of insurance required by Section 11 within the time specified therein, make a general assignment for the benefit of its creditors, fail to apply enough properly skilled workmen or specified materials to properly prosecute the Work in accordance with Contractor’s schedule, or otherwise materially breach any provision of the Contract Documents, then Owner may, without any prejudice to any other right or remedy, give Contractor Written Notice thereof. If Contractor fails to cure its default within ten (10) days, Owner may terminate the Agreement by giving Written Notice to Contractor. In such case, Owner may, in Owner’s sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor and/or take possession of the premises and all materials, tools, equipment, and appliances thereon, and finish the Work by whatever method Owner deems expedient. Contractor will not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, including compensation for additional administrative, architectural, consultant, and legal services (including without limitation attorney fees, expert fees, copy costs, and other expenses), such excess will be paid to Contractor. If such expense exceeds the unpaid balance, Contractor will pay the difference to Owner. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor’s indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

14.3 TERMINATION BY OWNER FOR CONVENIENCE

Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate the Agreement at any time. In the event of such termination, Contractor will be entitled to recover from Owner the

percentage of the Contract Sum equal to the percentage of the Work which Architect determines has been completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor. Without limitation, Contractor's indemnities and obligations under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

SECTION 15 - MISCELLANEOUS PROVISIONS

15.1 GOVERNING LAW

The parties acknowledge that the Contract Documents have substantial connections to the State of Utah. The Contract Documents will be deemed to have been made, executed, and delivered in Salt Lake City, Utah. To the maximum extent permitted by law, (i) the Contract Documents and all matters related to their creation and performance will be governed by and enforced in accordance with the laws of the State of Utah, excluding conflicts of law rules; and (ii) all disputes arising from or related to the Contract Documents will be decided only in a state or federal court located in Salt Lake City, Utah and not in any other court or state. Toward that end, the parties hereby consent to the jurisdiction of the state and federal courts located in Salt Lake City, Utah and waive any other venue to which they might be entitled by virtue of domicile, habitual residence, place of business, or otherwise.

15.2 NO WAIVER

No action or failure to act by Owner, Architect, or Contractor will constitute a waiver of a right or duty afforded them under the Contract Documents, nor will such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

15.3 RULE OF CONSTRUCTION

Owner and Contractor agree that the Contract Documents will be deemed to have been drafted by both Owner and Contractor and will not be construed against either Owner or Contractor because of authorship.

15.4 ENFORCEMENT

In the event either party commences legal action to enforce or rescind any provision of the Contract Documents, the prevailing party will be entitled to recover its attorney fees and costs, including without limitation all copy costs and expert and consultant fees and expenses, incurred in that action and on all appeals, from the other party.

15.5 TESTS AND INSPECTIONS

A. Owner and Architect have the right to have tests made when they deem it necessary. Tests conducted by Owner or Architect will be paid for by Owner. Should a test reveal a failure of the Work to meet Contract Document requirements, the cost of the test as well as subsequent tests related to the failure necessary to determine compliance with the Contract Documents will be paid for by Owner, with the cost thereof deducted from the Contract Sum by Modification.

B. Tests will be made in accordance with recognized standards by a competent, independent testing laboratory. Materials found defective or not in conformity with Contract Document requirements will be promptly replaced or repaired at the expense of Contractor.

C. Owner and Architect have the right to obtain samples of materials to be used in the Work and to test samples for determining whether they meet Contract Document requirements. Samples required for testing will be furnished by Contractor and selected as directed by Architect. Samples may be required from the sample's source, point of manufacture, point of delivery, or point of installation at Architect's discretion. Samples not required as a Submittal in the Specifications will be paid for by Owner. Should tests reveal a failure of the Sample to meet the Contract Document requirements, Contractor will provide other Samples that comply with the requirements of the Contract Documents.

END OF DOCUMENT

SUPPLEMENTARY CONDITIONS
FIXED SUM (U.S.)

ITEM 1 - GENERAL

1. Conditions of the Agreement and General Conditions apply to each Division of the Specifications.
2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

ITEM 2 - LIQUIDATED DAMAGE AMOUNTS:

1. The amount of liquidated damages to the benefit of the Contractor for delays under General Conditions Section 7.3, Paragraph B is $325 per day.
2. The amount of liquidated damages to be paid to the Owner for delays in Substantial Completion under General Conditions Section 8.3, Paragraph A is $325 per day.
3. The amount of liquidated damages to be paid to the Owner for delays in completing work itemized on the Substantial Completion Certificate under General Conditions Section 8.3, Paragraph B is $250 per day.

ITEM 3 - PERMITS

1. Delete Section 3.6, Paragraph B of the General Conditions and replace with the following:

   A. General Building Permit is not required. If required, this cost shall **NOT** be included in its bid. The Owner will reimburse the Contractor for this amount outside of the Bid Amount. The plumbing, mechanical and electrical permit fees are the responsibility of the Contractor and shall be included in its Bid Amount.

ITEM 4 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

Idaho

RETENTION APPLIED TO CONTRACTOR PAYMENTS FOR PROJECTS IN IDAHO:

Replace section 9.5.F of the General Conditions with the following:

F. In addition and notwithstanding the foregoing, Owner may also withhold and retain 5% of payments made to Contractor.

PAYMENT OF RETAINED FUNDS IN IDAHO:

Replace section 9.5 G of the General Conditions with the following:

G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within thirty-five (35) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner

receives a certificate of occupancy. The Owner may condition the final release of the retention upon receipt of satisfactory lien waivers from all persons with actual or potential lien claims on the work of improvement. The Parties agree that interest on any unpaid retainage will not accrue until after 35 days.

END OF DOCUMENT

4884-7961-0114

DIVISI0N 01: GENERAL REQUIREMENTS

01 1000 SUMMARY

01 1100 SUMMARY OF WORK
01 1200 MULTIPLE CONTRACT SUMMARY
01 1400 WORK RESTRICTIONS

01 2000 PRICE AND PAYMENT PROCEDURES

01 2900 PAYMENT PROCEDURES

01 3000 ADMINISTRATIVE REQUIREMENTS

01 3100 PROJECT MANAGEMENT AND COORDINATION
01 3200 CONSTRUCTION PROGRESS DOCUMENTATION
01 3300 SUBMITTAL PROCEDURES
01 3500 SPECIAL PROCEDURES

01 4000 QUALITY REQUIREMENTS

01 4000 QUALITY REQUIREMENTS
01 4200 REFERENCES
01 4301 QUALITY ASSURANCE - QUALIFICATIONS
01 4523 TESTING AND INSPECTION SERVICES
01 4546 DUCT TESTING, ADJUSTING, AND BALANCING

01 5000 TEMPORARY FACILITIES AND CONTROLS

01 5100 TEMPORARY UTILITIES
01 5200 CONSTRUCTION FACILITIES
01 5400 CONSTRUCTION AIDS
01 5600 TEMPORARY BARRIERS AND ENCLOSURES
01 5700 TEMPORARY CONTROLS
01 5800 PROJECT IDENTIFICATION

01 6000 PRODUCT REQUIREMENTS

01 6100 COMMON PRODUCT REQUIREMENTS
01 6200 PRODUCT OPTIONS
01 6400 OWNER-FURNISHED PRODUCTS
01 6600 PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

01 7000 EXECUTION AND CLOSEOUT REQUIREMENTS

01 7300 EXECUTION
01 7400 CLEANING AND WASTE MANAGEMENT
01 7700 CLOSEOUT PROCEDURES
01 7800 CLOSEOUT SUBMITTALS

END OF TABLE OF CONTENTS

SECTION 01 1100

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements Summary of Work requirements.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Provisions contained in Division 01 apply to Sections of Divisions 02 through 49 of Specifications. Instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, obligations set forth in Contract Documents are obligations of Contractor.

B. Contractor shall furnish total labor, materials, equipment, and services necessary to perform The Work in accordance with Contract Documents.

1.3 WORK BY OWNER

A. Owner will furnish and install some portions of The Work with its own forces. Contractor will be provided with schedule of when these items are to be performed.
   1. General:
      a. Complete work necessary to accommodate work to be performed by Owner before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work.
      b. Store and protect completed work provided by Owner until date of Substantial Completion.
   2. Work furnished and installed by Owner include, but are not limited to, following:
      a. High Security Cylinders and Cores:
      b. Selected Commercial Toilet Accessories.
      c. Carpet and Carpet Base.
      d. Owner will terminate building telephone cables at terminal board.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 1200

MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Multiple Contracts.

1.2 SUMMARY OF CONTRACTS

A. Owner has issued or will issue separate contracts for operations scheduled to be completed between Notice to Proceed and Substantial Completion.
   1. General:
      a. Schedule performance of work covered by such separate contracts in Contractor's Construction Schedule so as to avoid delays in Substantial Completion. Give written notice to such contractors and to Owner of any revisions to scheduled delivery and work dates at least 90 days in advance.
      b. Complete work necessary to accommodate items provided under such separate contracts before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work including, but not limited to, cost of crews during downtime or for call backs and costs to correct substrate deficiencies.
      c. Store and protect completed work provided under separate contracts until date of Substantial Completion.
   2. Sheet Carpeting. See Section 09 6816.
   3. Soap dispensers, paper towel dispensers, and toilet tissue dispensers. See Section 10 2813
   4. Testing and Inspection. See Section 01 4523 “Testing and Inspection” for testing and inspection, and testing laboratory services for materials, products, and construction methods:
      a. Air System Testing, Adjusting, and Balance. See Section 01 4546.
      b. Concrete. See Section 03 3111.
      c. Concrete Moisture Vapor Emission and Alkalinity level. See Section 09 0503, Section 09 6466, Section 09 6519, and Section 09 6567.
      d. Drill-In Mechanical Anchors / Adhesive Anchors / Screw Anchors. See Section 03 1511 and Section 04 0519.
      e. Fill / Engineering Fill. See Section 31 2323.
      f. Masonry (Non-structural). Tests and inspections is not required. See Section 04 0501 ‘Common Masonry Requirements’.
      g. Reinforcement Bars. See Section 03 2100 (Epoxy-Coated Reinforcement Bars. See Section 03 2116).
      h. Shop-Fabricated Wood Trusses: Metal Plate Connected Wood Trusses. See Section 06 1753.
      i. Wood Panel Product Sheathing. See Section 06 1636.
   5. Tile Carpeting. See Section 09 6813.

B. Owner has issued or will issue separate contracts for operations normally scheduled to follow Substantial Completion.
   1. General:
      a. Give written notice to such contractors and to Owner of any revisions of scheduled date of Substantial Completion at least 90 days in advance. Contractor will be back charged for actual expenses incurred by Owner for failure to accurately report date of Substantial Completion.

b. Complete work necessary to accommodate items provided under such separate contracts before Substantial Completion. Contractor will be back charged for actual expenses incurred by Owner for failure to complete such work before Substantial Completion.

2. Furnishings.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 1400

WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Work Restrictions.

1.2 PROJECT CONDITIONS

A. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and their employees comply with following requirements:
   1. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
   2. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project site.
   3. Do not allow use of tobacco in any form on Project Site.
   4. Do not allow pornographic or other indecent materials on site.
   5. Do not allow work on Project site on Sundays except for emergency work.
   6. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
   7. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
   8. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
   9. Do not build fires on Project Site.
   10. Do not allow weapons on Project Site, except those carried by law enforcement officers or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.

B. Existing Facilities: The owner will be using existing facilities during construction. The exit where construction will need to protected to not allow access from users during construction.

C. Do not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Questions of structural loading as part of construction means and methods shall be addressed by a licensed structural engineer engaged by Contractor, subject to the review by Architect.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 2900

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements to prepare and process Applications for Payments.

1.2 PAYMENT REQUESTS

A. Use Payment Request forms provided by Owner.

B. Each Payment Request will be consistent with previous requests and payments certified by Architect and paid for by Owner.

C. Request Preparation:
   1. Complete every entry on Payment Request form.
   2. Entries will match data on approved schedule of values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
   3. Submit signed Payment Request to Architect with current Construction Schedule.

D. Provide following submittals before or with submittal of Initial Payment Request:
   1. List of Subcontractors.
   2. Initial progress report.
   3. Contractor's Construction Schedule.
   4. Submittal Schedule.

E. Provide Affidavit of Contractor and Consent of Surety with Payment Request following Substantial Completion.

1.3 SCHEDULE OF VALUES

A. Submit schedule of values on Owner's standard form to Architect 20 days minimum before submission of Initial Payment Request as a necessary condition before payment will be processed. Coordinate preparation of schedule of values with preparation of Contractor's Construction Schedule. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:
   1. Contractor's Construction Schedule.
   2. Payment Request form.
   3. Schedule of Allowances.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Project Management and Coordination on Projects.

1.2 PROJECT COORDINATION

A. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.

B. Project designation for this Project is LDS 531-1160-220201-01, Maple Grove Fire.

C. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.

1.3 MULTIPLE CONTRACT COORDINATION

A. Contractor shall be responsible for accurately maintaining and reporting schedule of The Work from Notice to Proceed to date of Substantial Completion.

B. Contractor shall be responsible for providing Temporary Facilities And Controls for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

C. Contractor shall be responsible for providing Construction Waste Management And Disposal services for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

D. Contractor shall be responsible for Final Cleaning for entire Project.

1.4 PROJECT MEETINGS AND CONFERENCES

A. Preconstruction Conference:
   1. Attend preconstruction conference and organizational meeting scheduled by Architect at Project site or other convenient location.
   2. Be prepared to discuss items of significance that could affect progress, including such topics as:
      a. Construction schedule.
      b. Critical Work sequencing.
      c. Current problems.
      d. Designation of responsible personnel.
      e. Distribution of Contract Documents.
      f. Equipment deliveries and priorities.
      g. General schedule of inspections by Architect and its consultants.
      h. General inspection of tests.
      i. Office, work, and storage areas.
      j. Preparation of record documents and O & M manuals.
      k. Procedures for processing interpretations and Modifications.
      l. Procedures for processing Payment Requests.
      m. Project cleanup.

n. Security.
o. Status of permits.
p. Submittal of Product Data, Shop Drawings, Samples, Quality Assurance / Control submittals.
q. Use of the premises.
r. Work restrictions.
s. Working hours.

3. Architect will record minutes of meetings and distribute copies to Owner and Contractor within three (3) working days.

B. Progress Meetings:
1. Attend progress meetings at Project site at regularly scheduled intervals determined by Architect, at least once a month.
2. Progress meetings will be open to Owner, Architect, Subcontractors, and anyone invited by Owner, Architect, and Contractor.
3. Be prepared to discuss items of significance that could affect progress, including following:
a. Progress since last meeting.
b. Whether Contractor is on schedule.
c. Activities required to complete Project within Contract Time.
d. Labor and materials provided under separate contracts.
e. Off-site fabrication problems.
f. Access.
g. Site use.
h. Temporary facilities and services.
i. Hours of work.
j. Hazards and risks.
k. Project cleanup.
l. Quality and Work standards.
m. Status of pending modifications.
n. Documentation of information for Payment Requests.
o. Maintenance of Project records.
4. Architect will prepare minutes of progress meetings and distribute copies of minutes to Owner and Contractor within three (3) working days.

C. Pre-Installation Conferences:
1. Attend pre-installation conferences specified in Contract Document.
a. If possible, schedule these conferences on same day as regularly scheduled Progress Meetings. If this is not possible, coordinate scheduling with Architect.
b. Request input from attendees in preparing agenda.
2. Be prepared to discuss following items:
a. Requirements of Contract Documents.
b. Completed work necessary for installation of items or systems.
c. Conditions not in compliance with installation requirements.
d. Installation and inspection schedule.
e. Coordination between trades.
f. Space and access limitations.
g. Testing.
3. Architect will prepare meeting minutes and distribute minutes to Owner and Contractor within three (3) working days.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 3200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for documenting the progress of construction during performance of the Work.

1.2 SCHEDULING OF WORK

A. Bar Chart Schedule:
   1. Submit horizontal bar chart schedule before Preconstruction Conference. Provide separate time bar for each construction activity listed on Owner's payment request form. Within each time bar, show estimated completion percentage. Provide continuous vertical line to identify first working day of each week. Show each activity in chronological sequence. Show graphically sequences necessary for completion of related portions of The Work. As The Work progresses, place contrasting mark in each bar to indicate actual completion.
   2. Provide copies of schedule for Architect and Owner and post copy in field office.
   3. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.
   4. Project Management Software Programs:
      a. Any software project management program capable of Bar Chart Scheduling for projects of equal size and complexity is approved by Contractor and approved by Owner's Project Manager.

B. Daily Construction Reports:
   1. Prepare daily reports of operations at Project including at least following information:
      a. List of Subcontractors at site.
      b. Approximate count of personnel at site by trade.
      c. High and low temperatures, general weather conditions.
      d. Major items of equipment on site.
      e. Materials, equipment, or Owner-furnished items arriving at or leaving site.
      f. Accidents and unusual events.
      g. Site or structure damage by water, frost, wind, or other causes.
      h. Meetings, conferences, and significant decisions.
      i. Visitors to the job including meeting attendees.
      j. Stoppages, delays, shortages, losses.
      k. Any tests made and their result if known.
      l. Meter readings and similar recordings.
      m. Emergency procedures.
      n. Orders and requests of governing authorities.
      o. Modifications received, carried out.
      p. Services connected, disconnected.
      q. Equipment or system tests and start-ups.
      r. Brief summary of work accomplished that day.
      s. Signature of person preparing report.
   2. Submit daily reports to Architect at least weekly.
   3. Maintain copies of daily reports at field office.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Submittal Procedures.

B. Related Requirements:
   1. Section 01 7800: 'Closeout Submittals' for administrative and procedural requirements for closeout submittals.

1.2 SUBMITTAL SCHEDULE

A. Furnish submittal schedule within 20 days after receipt of Notice to Proceed, listing items specified to be furnished for review to Architect including product data, shop drawings, samples, and Informational submittals.
   1. Coordinate submittal schedule with Contractor's construction schedule.
   2. Enclose the following information for each item:
      a. Scheduled date for first submittal.
      b. Related Section number.
      c. Submittal category.
      d. Name of Subcontractor.
      e. Description of part of the Work covered.
      f. Scheduled date for resubmittal.
      g. Scheduled date for Architect's final release or approval.

B. Print and distribute copies to Architect and Owner and post copy in field office. When revisions are made, distribute to same parties and post in same location.

C. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.

1.3 SUBMITTAL PROCEDURES

A. Coordination:
   1. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
      a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
      b. Coordinate transmittal of different types of submittals required for related elements of The Work so processing will not be delayed by need to review submittals concurrently for coordination. Architect reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
   2. Processing Time:
      a. Allow sufficient review time so installation will not be delayed by time required to process submittals, including time for resubmittals.
         1) Allow 21 days for initial review. Allow additional time if processing must be delayed allowing coordination with subsequent submittals. Architect will promptly advise Contractor when submittal being processed must be delayed for coordination.

2) If an intermediate submittal is necessary, process same as initial submittal.
3) Allow 10 days for reprocessing each submittal.
4) No extension of Contract Time will be authorized because of failure to transmit submittals to Architect in sufficient time before work is to be performed to allow processing.

3. Identification:
   a. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
      1) Provide space approximately 4 by 5 inches on label or beside title block on Shop Drawings to record Contractor's review and approval markings and action taken.
      2) Include following information on label for processing and recording action taken:
         a) Project name.
         b) Date.
         c) Name and address of Architect.
         d) Name and address of Contractor.
         e) Name and address of Subcontractor.
         f) Name and address of supplier.
         g) Name of manufacturer.
         h) Number and title of appropriate Specification Section.
         i) Drawing number and detail references, as appropriate.
4. Transmittal:
   a. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using transmittal letter. On transmittal, record relevant information and requests for data. Include Contractor's certification that information complies with Contract Document requirements, or, on form or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations.
   b. Submittals received from sources other than Contractor or not marked with Contractor's approval will be returned without action.

1.4 ACTION SUBMITTALS

A. Product Data:
1. Submit Product Data, as required by individual Sections of Specifications.
2. Mark each copy of each set of submittals to show choices and options used on Project. Where printed Product Data includes information on products that are not required for Project, mark copies to indicate information relating to Project.
3. Certify that proposed product complies with requirements of Contract Documents. List any deviations from those requirements on form or separate sheet.
4. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
5. Submit electronic files PDF: Architect will return a PDF copy marked with action taken and with corrections or modifications required.

B. Shop Drawings:
1. Submit newly prepared graphic data to accurate scale. Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 36 by 48 inches (915 by 1 200 mm). Highlight, encircle, or otherwise show deviations from Contract Documents. Include following information as a minimum:
   a. Dimensions.
   b. Identification of products and materials included.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
2. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings. Standard printed information prepared without specific reference to Project is not acceptable as Shop Drawings.
3. Review and designate (stamp) approval of shop drawings. Unless otherwise specified, submit to Architect six copies of shop drawings required by Contract Documents. Shop drawings not

required by Contract Documents, but requested by Contractor or supplied by Subcontractor, need not be submitted to Architect for review.

C. Samples:
   1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
      a. Mount, display, or package Samples to ease review of qualities specified. Prepare Samples to match samples provided by Architect, if applicable. Include following:
         1) Generic description of Sample.
         2) Sample source.
         3) Product name or name of manufacturer.
         4) Compliance with recognized standards.
         5) Availability and delivery time.
   2. Submit Samples for review of kind, color, pattern, and texture, for final check of these characteristics with other elements, and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
      a. Where variations in color, pattern, texture or other characteristics are inherent in material or product represented, submit set of three samples minimum that show approximate limits of variations.
      b. Refer to other specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
      c. Refer to other Sections for Samples to be returned to Contractor for incorporation into The Work. Such Samples shall be undamaged at time of use. On transmittal, indicate special requests regarding disposition of Sample submittals.
   3. Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit full set of choices for material or product. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
   4. Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three sets. One will be returned marked with action taken.
   5. Samples, as accepted and returned by Architect, will be used for quality comparisons throughout course of construction.
      a. Unless noncompliance with Contract Documents is observed, submittal may serve as final submittal.
      b. Sample sets may be used to obtain final acceptance of construction associated with each set.

1.5 INFORMATIONAL SUBMITTALS

A. Informational submittals are design data, test reports, certificates, manufacturer's instructions, manufacturer's field reports, and other documentary data affirming quality of products and installations. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required. [or] Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.
   1. Certificates: Describe certificates intended to document affirmations by Contractor or others that the work is in accordance with the Contract Documents, but do not repeat provisions of Parts 2 or 3.
   2. Delegated Design Submittals / Design Data: Describe submittals intended to demonstrate design work prepared by Contractor’s licensed professionals.
   3. Test And Evaluation Reports: Describe submittal of test reports or evaluation service reports intended to document required tests.
   4. Manufacturer Instructions: Describe submittals intended to document manufacturer instructions.
   5. Source Quality Control Submittals: Describe submittal of source quality control documentation.
   6. Field Quality Control Submittals: Describe submittal of field quality control documentation.

7. Manufacturer Reports: Describe submittal of Manufacturer reports as documentation of manufacturer activities.
8. Special Procedure Submittals: Describe submittals intended to document special procedures. An example would be construction staging or phasing for remodeling an existing facility while keeping it in operation. While the Contractor would normally be responsible for managing this, submittal of his plan as documentation could be specified.
9. Qualification Statements: Describe submittals intended to document qualifications of entities employed by Contractor.

1.6 CLOSEOUT SUBMITTALS

A. This title groups submittals that occur during project closeout. Coordinate with section 01 7800 Closeout Submittals.
   1. As Built Record Drawings as defined in the Agreement.
   2. Project Manual: Complete Project Manual including Addenda and Modifications as defined in General Conditions.
   3. Maintenance Contracts: Describe submittal of the maintenance contract specific to the Section.
   4. Operations & Maintenance Data: Describe submittal of operation and maintenance data necessary for products of the Section.
   5. Warranty Documentation: Describe submittal of final executed warranty document specific to the Section.
   6. Record Documentation: Describe submittal of record documentation specific to the Section.
   7. Software: Describe submittal system software and programming software specific to the Section.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. This title groups maintenance material required submittals specific to the Section. Items may be provided at completion of Work or submitted with section 01 7800 Closeout Submittals:
   1. Spare Parts: Describe spare parts necessary for Owner's use in facility operation and maintenance. 'Parts' are generally understood to be items such as filters, motor drive belts, lamps, and other similar manufactured items that require only simple replacement.
   2. Extra Stock Materials: Describe extra stock materials to be provided for Owner's use in facility operation and maintenance. Extra stock materials are generally understood to be items such as ceiling tiles, flooring, paint etc.
   3. Tools:
      a. Describe tools to be provided for Owner's use in facility operation and maintenance. Tools are generally understood to be wrenches, gauges, circuit setters, etc, required for proper operation or maintenance of a system.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 3500

SPECIAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Special Procedures.

1.2 REFERENCES

A. Association Publications:
   1. U.S. Department of Labor, Occupational Safety and Health Administration:
      a. 29 CFR 1926 OSHA, 'Construction Industry Regulations' (January 2014 or latest version).
         1) 29 CFR 1926.20, 'General Safety And Health Provisions'.
         2) 29 CFR 1926.64, 'Hot Work Permit'.
         3) 29 CFR 1926.352, 'Fire Prevention'.
         4) 29 CFR 1926.500, 'Fall Protection'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Acceleration of Work:
   1. Complete The Work in accordance with Construction Schedule. If Contractor falls behind schedule, take such actions as are necessary, at no additional expense to Owner, to bring progress of The Work back in accordance with schedule.
   2. Owner may request proposal for completion of The Work at date earlier than expiration of Contract Time:
      a. Promptly provide requested proposal showing cost of such acceleration of The Work. Consult with Owner and Architect regarding possible options to decrease cost of such acceleration.
      b. If Owner determines to order acceleration of The Work, change in Contract Sum and Contract Time resulting from acceleration will be included in a Change Order.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Meet regulations of 29 CFR 1926 OSHA, 'Construction Industry Regulations'.
   2. Owner's Safety Requirements:
      a. Personal Protection:
         1) Contractor shall ensure:
            a) Positive means of fall protection, such as guardrails system, safety net system, personal fall arrest system, etc, is provided to employees whenever exposed to a fall 6 feet (1.80 m) or more above a lower level.
            b) Personnel working on Project shall wear hard hats and safety glasses as required by regulation and hazard.
            c) Personnel working on Project shall wear long or short sleeve shirts, long pants, and hard-toed boots or other sturdy shoes appropriate to type and phase of work being performed.
      b. Contractor Tools And Equipment:
         1) Contractor shall ensure:

a) Tools and equipment are in good working condition, well maintained, and have necessary guards in place.
b) Ground Fault Circuit Interrupters (GFCI) is utilized on power cords and tools.
c) Scaffolding and man lifts are in good working condition, erected and maintained as required by governmental regulations.
d) Ladders are in good condition, well maintained, used as specified by Manufacturer, and secured as required.

c. Miscellaneous:
1) Contractor shall ensure:
a) Protection is provided on protruding rebar and other similar objects.
b) General Contractor Superintendent has completed the OSHA 10-hour construction outreach training course or equivalent.
c) Implementation and administration of safety program on Project.
d) Material Safety Data Sheets (MSDS) are provided for substances or materials for which an MSDS is required by governmental regulations before bringing on site.
e) Consistent safety training is provided to employees on Project.
f) Implement and coordinate Lockout / Tagout procedures with Owner's Representative as required.
2) Report accidents involving injury to employees on Project that require off-site medical treatment to Owner's designated representative.

d. Hot Work Permit:
1) Permit shall document that fire prevention and protection requirements in 29 CFR 1926.352, 'Fire Prevention' have been implemented prior to beginning hot work operations.
2) Required for doing hot work involving open flames or producing heat or sparks such as:
a) Brazing.
b) Cutting.
c) Grinding.
d) Soldering.
e) Thawing pipe.
f) Welding.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4200

REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Reference standards, definitions, specification format, and industry standards.

1.2 REFERENCES

A. Definitions:
   1. Approved: The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
   2. Directed: The term "directed" is a command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," and "permitted" have the same meaning as "directed."
   3. Experienced: The term "experienced," when used with an entity, means having successfully completed a minimum often previous projects similar in size and scope to this Project; being familiar with the special requirements indicated, and having complied with requirements of authority having jurisdiction.
   4. Furnish: The term "furnish" means supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
   5. General: Basic Contract definitions are included in the Conditions of the Contract.
   6. Indicated: The term "indicated" refers to requirements expressed by graphic representations, or in written form on Drawings, in Specifications, and in other Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
   7. Install: The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
   8. Installer: An "Installer" is the Contractor, or another entity engaged by the Contractor, as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   9. Project Site: The term "Project site" means the space available for performing construction activities. The extent of the Project site is shown on the Drawings and mayor may not be identical with the description of the land on which the Project is to be built.
   10. Provide: The term "provide" means to furnish and install, complete and ready for the intended use.
   11. Regulations: The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
   12. Submitted: The terms "submitted," "reported," "satisfactory" and similar words and phrases means submitted to Architect, reported to Architect and similar phrases.
   13. Testing Agencies: A "testing agency" is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, or to report on and, if required, to interpret results of those inspections or tests.
   14. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

B. References Standards:

1. Specification Format: Specifications will follow MasterFormat™ 2004 for organizing numbers and titles. (The Construction Specifications Institute, Project Resource Manual/CSI Manual of Practice, 5th *Edition*. New York, McGraw-Hill, 2005).
   a. Specification Identifications:
      1) The Specifications use section numbers and titles to help cross referencing in the Contract Documents.
      2) Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
   b. Specification Language:
      1) Specifications should be prepared, with concern and respect for their legal status. Specifications should be Clear, Concise, Correct and Complete.
      2) Streamlining: Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference
   c. Sentence Structure:
      1) Specifications to be written in the “Imperative Mood”.
         a) The verb that clearly defines the action becomes the first word in the sentence.
         b) The imperative sentence is concise and readily understandable.
      2) Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference.
   d. Abbreviated Language:
      1) Abbreviations should be used only on drawings and schedules where space is limited.
      2) Abbreviations with multiple meanings should be avoided, unless used in different disciplines where their meaning is clear from the context in which they are used.
      3) Abbreviations should be limited to five or fewer letters
         a) The verb that clearly defines the action becomes the first word in the sentence.
   e. Symbols:
      1) Caution should apply to symbols substituted for words or terms.
   f. Numbers:
      1) The use of Arabic numerals rather that words for numbers is recommended.

C. Industry Standards:
   1. Except where Contract Documents specify otherwise, construction industry standards will apply and are made a part of Contract Documents by reference.
   2. Where compliance with two or more standards is specified and standards apparently establish different or conflicting requirements for minimum quantities or quality levels, refer to Architect for decision before proceeding. Quantity or quality level shown or specified will be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.
   3. Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents. Where copies of standards are needed for performance of a required construction activity, Contractor will obtain copies directly from publication source.
   4. Trade Association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean association names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

AABC	Associated Air Balance Council	Washington	DC	(202) 737-0202	www.aabchq.com
AAMA	American Architectural Manufacturers Association	Schaumburg	IL	(847) 303-5664	www.aamanet.org
AASHTO	American Association of State Highway & Transportation Officials	Washington	DC	(202) 624-5800	www.aashto.org

AAMA	American Architectural Manufacturers Association	Schamumburg	IL	(847) 303-5774	www.aamanet.org
AASHTO	American association of State Highways and Transportation Officials	Washington	DC		www.transportation.org www.aashto.org
ACI	American Concrete Institute International	Farmington Hills	MI	(248) 848-3700	www.aci-int.org
AGA	American Gas Association	Washington	DC	(202) 824-7000	www.aga.org
AHRI	Air Conditioning Heating & Refrigeration Institute	Arlington	VA	(703) 524-8800	www.ari.org
AIA	American Institution of Architects	Washington	DC	(202) 626-7300	www.aia.org
AISC	American Institute of Steel Construction	Chicago	IL	(312) 670-2400	www.aisc.org
AISI	American Iron & Steel Institute	Washington	DC	(202) 452-7100	www.steel.org
AITC	American Institution of Timber Construction	Englewood	CO	(303) 792-9559	www.aitc-glulam.org
AMCA	Air Movement & Control Association International	Arlington Heights	IL	(847) 394-0150	www.amca.org
ANSI	American National Standards Institute	New York	NY	(212) 642-4900	www.ansi.org
APA	APA-Engineered Wood Association	Tacoma	WA	(253) 565-6600	www.apawood.org
API	American Petroleum Institute	Washington	DC	(202) 682-8000	www.api.org
AQMD	South Coast Air Quality Management District	Diamond Bar	CA	(909) 396-2000	www.aqmd.gov
ASHRAE	American Society of Heating, Refrigerating, & Air-Conditioning Engineers	Atlanta	GA	(404) 636-8400	www.ashrae.org
ASME	American Society of Mechanical Engineers International	New York	NY	(800) 843-2763	www.asme.org
ASTM	ASTM International	West Conshohocken	PA	(610) 832-9500	www.astm.org
AWI	Architectural Woodwork Institute	Potomac Falls	VA	(571) 323-3636	www.awinet.org
AWPA	American Wood Protection Association	Birmingham	AL	(205) 733-4077	www.awpa.com
AWS	American Welding Society	Miami	FL	(800) 443-9353	www.aws.org
AWWA	American Water Works Assoc	Denver	CO	(303) 794-7711	www.awwa.org
BHMA	Builders Hardware Manufacturers Association	New York	NY	(212) 297-2122	www.buildershardware.com
BIA	Brick Industry Association	Reston	VA	(703) 620-0010	www.bia.org
CFI	International Certified Floorcovering Installers, Inc.	Kansas City	MO	(816) 231-4646	www.cfi-installers.org
CRI	Carpet & Rug Institution	Dalton	GA	(706) 278-3176	www.carpet-rug.com
CRSI	Concrete Reinforcing Steel Institute	Schaumburg	IL	(847) 517-1200	www.crsi.org
CISPI	Cast Iron Soil Pipe Institute	Chattanooga	TN	(423) 892-0137	www.cispi.org
DHI	Door & Hardware Institute	Chantilly	VA	(703) 222-2010	www.dhi.org
DIPRA	Ductile Iron Pipe Research Association.	Birmingham	AL	(205) 402-8700	www.dipra.org
EIMA	EIFS Industry Members Association	Morrow	GA	(800) 294-3462	www.eima.com
FM	FM Global	Johnston	RI	(401) 275-3000	www.fmglobal.com

FSC	Forest Stewardship Council	Bonn, Germany		+49 (0) 228 367 66 0	www.fsc.org
GA	Gypsum Association	Hyattsville	MD	(301) 277-8686	www.gypsum.org
GS	Green Seal	Washington	DC	(202) 872-6400	www.greenseal.org
HPVA	Hardwood Plywood & Veneer Association	Reston	VA	(703) 435-2900	www.hpva.org
ICC	International Code Council	Washington	DC	(888) 422-7233	www.iccsafe.org
ICC-ES	ICC Evaluation Service	Whittier	CA	(562) 699-0543	www.icc-es.org
ICBO	International Conference of Building Officials				(See ICC)
ISO	International Organization for Standardization	Geneva, Switzerland			www.iso.org
ISSA	International Slurry Surfacing Association	Annapolis	MD	(410) 267-0023	www.slurry.org
KCMA	Kitchen Cabinet Manufactures Association	Reston	VA	(703) 264-1690	www.kcma.org
LPI	Lightning Protection Institute	Maryville	MO	(800) 488-6864	www.lightning.org
MFMA	Maple Flooring Manufacturers' Association	Deerfield	IL	(888) 480-9138	www.maplefloor.org
MSS	Manufacturer's Standardization Society of The Valve and Fittings Industry	Vienna	VA	(703) 281-6613	www.mss-hq.com
NAAMM	National Association of Architectural Metal Manufacturers	Glen Ellyn	IL	(630) 942-6591	www.naamm.org
NEC	National Electric Code	(from NFPA).			
NEMA	National Electrical Manufacturer's Association	Rosslyn	VA	(703) 841-3200	www.nema.org
NFPA	National Fire Protection Association	Quincy	MA	(800) 344-3555	www.nfpa.org
NFRC	National Fenestration Rating Council	Greenbelt	MD	(301) 589-1776	www.nfrc.org
NSF	NSF International	Ann Arbor	MI	(734) 769-8010	www.nsf.org
PCA	Portland Cement Association	Skokie	IL	(847) 966-6200	www.cement.org
PCI	Precast / Prestressed Concrete Institute	Chicago	IL	(312) 786-0300	www.pci.org
PEI	Porcelain Enamel Institute	Norcross	GA	(770) 676-9366	www.porcelainenamel.com
RFCI	Resilient Floor Covering Institute	LaGrange	GA	(706) 882-3833	www.rfci.com
SCTE	Society of Cable Telecommunications Engineers	Exton	PA	(800) 542-5040	www.scte.org
SDI	Steel Deck Institute	Fox River Grove	IL	(847) 458-4647	www.sdi.org
SDI	Steel Door Institute	Westlake	OH	(440) 899-0010	www.steeldoor.org
SIGMA	Sealed Insulating Glass Manufacturer's Association	Chicago	IL	(312) 644-6610	www.arcat.com
SJI	Steel Joist Institute	Myrtle Beach	SC	(843) 293-1995	www.steeljoist.org
SMACNA	Sheet Metal & Air Conditioning Contractors National Association	Chantilly	VA	(703) 803-2980	www.smacna.org
SPIB	Southern Pine Inspection Bureau	Pensacola	FL	(850) 434-2611	www.spib.org
SSMA	Steel Stud Manufacturer's Association	Glen Ellyn	IL	(630) 942-6592	www.ssma.com
TCNA	Tile Council of North America	Anderson	SC	(864) 646-8453	www.tileusa.com
TPI	Truss Plate Institute	Alexandria	VA	(703) 683-1010	www.tpinst.org

TPI	Turfgrass Producers International (formally American Sod Producers Association)	East Dundee	IL	(847) 649-5555	www.turfgrasssod.org
UL	Underwriters Laboratories	Camas	WA	(877) 854-3577	www.ul.com
WDMA	Window and Door Manufacturer's Association	Chicago	IL	(312) 321-6802	www.nwwda.org
WWPA	Western Wood Products Association	Portland	OR	(503) 224-3930	www.wwpa.org

D. Federal Government Agencies:
1. Names and titles of federal government standard or specification producing agencies are often abbreviated. Following acronyms or abbreviations referenced in Contract Documents represent names of standard or specification producing agencies of federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

CS	Commercial Standard (U S Department of Commerce)	Washington	DC	(202) 512-0000	www.doc.gov
EPA	Environmental Protection Agency	Washington	DC	(202) 272-0167	www.epa.gov
FCC	Federal Communications Commission	Washington	DC	(888) 225-5322	www.fcc.gov
FS	Federal Specifications Unit (Available from GSA)	Washington	DC	(202) 619-8925	www.gsa.gov
MIL	Military Standardization Documents (U S Department of Defense)	Philadelphia	PA	(215) 697-2179	www.dod.gov
NIST	National Institute of Standards and Technology, technology Administration (US Department of Commerce)	Gaithersburg	MD	(301) 975-4500	www.ts.nist.gov
OSHA	Occupational Safety & Health Administration (U S Department of Labor)	Washington	DC	202) 219-8148	www.osha.gov
PS	Product Standard of NBS (U S Department of Commerce)	Washington	DC	(202) 512-1800	www.doc.gov

E. Governing Regulations / Authorities:
1. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
2. Obtain copies of regulations required to be retained at Project Site, available for reference by parties who have a reasonable need for such reference.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4301

QUALITY ASSURANCE - QUALIFICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
1. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Requirements:
1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.

1.2 REFERENCES

A. Definitions:
1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
2. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
3. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
4. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.

B. Reference Standards:
1. ASTM International:
a. ASTM E329-18, 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.'

1.3 QUALIFICATIONS

A. Qualifications: Qualifications paragraphs in this Article establish minimum qualification levels required; individual Specification Sections specify additional requirements:
1. Manufacturers / Distributors / Fabricator / Suppliers / Installers Qualifications: Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
a. Owner established Relationships:
1) Where heading 'Category One, Two, or Three Approved' *Manufacturers / Suppliers / Distributors / Installers*' is used to identify list Owner established Relationships, Owner has established relationships that extend beyond requirements of this Project.
2) No other *Manufacturers / Suppliers / Distributors / Installers* will be acceptable.
3) Follow specified procedures to preserve relationships between Owner and specified *Manufacturers / Suppliers / Distributors / Installers* and advantages that accrue to Owner from those relationships.
a) Common Finish Hardware Requirements, Section 08 7101: Category Three Approved, no other Supplier accepted:

(1) Accessories, Section 08 7109.
(2) Accessories for Pairs of Doors, Section 08 7105.
(3) Closing Devices, Section 08 7106.
(4) Hanging Devices, Section 08 7102.
(5) Operating Trim, Section 08 7104.
(6) Protective Plates and Trim, Section 08 7107.
(7) Securing Devices, Section 08 7103.
(8) Stops and Holders, Section 08 7108.

b) Custom Hollow Metal Doors and Frames, Section 08 1113: Category Three Approved, no other Supplier accepted:
c) Flush Wood Doors: Factory Finished, Clear, Section 08 1429: Category Three Approved, no other Supplier accepted.
d) Hollow Metal Frames, Section 08 1213: Category Three Approved, no other Supplier accepted.
e) Hollow Metal Doors, Section 08 1313: Category Three Approved, no other Supplier accepted.
f) Sheet Carpeting, Section 09 6816: Category One Approved, no other Manufacturer / Installers accepted.
g) Tile Carpeting, Section 09 6813: Category One Approved, no other Manufacturer / Installers accepted.

b. Approved:
1) Where heading '*Approved Suppliers / Distributors / Installers / Applicators / Fabricators*' is used to identify list of specified suppliers / distributors / installers / applicators / fabricators, use only listed suppliers / installers / fabricators.
2) No substitutions will be allowed.
3) Following areas of the Work have restrictions on sub-bids by which may be accepted by Contractor:
a) Audio Systems, Section 27 5117: Alternate Installers approved by Owner before bidding.
b) Sound, Division 27: Installers approved by Architect before bidding.
c) Video Systems, Section 27 4117: Alternate Installers approved by Owner before bidding.

2. Factory-Authorized Service Representative Qualifications:
a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
3. Installer Qualifications:
a. Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
4. Manufacturer Qualifications:
a. Firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
5. Manufacturer's Field Services Qualifications:
a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
6. Professional Engineer Qualifications:
a. Professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
7. Specialists:
a. Certain sections of Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations.
b. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.
c. Requirement for specialists shall not supersede building codes and regulations governing the Work.
8. Testing Agency Qualifications:

a. Independent Testing Agency with experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
   1) Testing Laboratory:
      a) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
      b) Cement and Concrete Reference Laboratory (CCRL).
      c) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
      d) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4523

TESTING AND INSPECTING SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section

1.2 SUMMARY

A. This Section includes testing, inspections, special testing, special inspections, and testing laboratory services for materials, products, and construction methods as specified hereafter for the Work.

B. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures to fully comply with Contract Document requirements in all regards.

C. Costs: Costs of initial services for testing and inspection personnel will be paid by Owner unless otherwise noted.
   1. If initial tests indicate non-compliance with contract document requirements, any subsequent testing will be performed by same personnel and paid for by Contractor.

D. Related Requirements:
   1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
   2. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   3. Division 01 through Division 49 establish responsibility for providing specific testing and inspections and Field Tests and Inspections.

1.3 REFERENCES

A. Association Publications:
   1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
   2. International Code Council (IBC):
      a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

B. Definitions:
   1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
   2. Approved: To authorize, endorse, validate, confirm, or agree to.
   3. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
   4. Inspection/Special Inspection:
      a. Inspection: Not required by code provisions but may be required by Contract Documents.
      b. Special Inspection: Inspection required of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance

with approved construction documents and reference standards (required by code provisions and by Contract Documents).
   c. Special Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
   d. Special Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
5. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. They are not samples. Approved mockups establish standard by which the Work will be judged.
6. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
7. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
8. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
9. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
10. Special Inspection: See Inspection.
11. Special Inspector: Certified individual or firm that implements special inspection program for project.
12. Special Test: See Test.
13. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship:
   a. Test: Not required by code provisions but may be required by Contract Documents.
   b. Special Test: Required by code provisions and by Contract Documents.
14. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
15. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
16. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:
1. ASTM International:
   a. ASTM A898/A898M-17, ‘Standard Specification for Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes’.
   b. ASTM C42/C42M-18, ‘Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete'.
   c. ASTM C138/C138M-17a, 'Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete'.
   d. ASTM C597-16, ‘Standard Test Method for Pulse Velocity Through Concrete'.
   e. ASTM C803/C803M-18, ‘Standard Test Method for Penetration Resistance of Hardened Concrete'.
   f. ASTM C805/C805M-13a, ‘Standard Test Method for Rebound Number of Hardened Concrete'.
   g. ASTM C1019-18, ‘Standard Test Method for Sampling and Testing Grout’.
   h. ASTM C1021-08(2014), ‘Standard Practice for Laboratories Engaged in Testing of Building Sealants’.
   i. ASTM C1077-17, ‘Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation’.
   j. ASTM C1093-15a, ‘Standard Practice for Accreditation of Testing Agencies for Masonry.
   k. ASTM D3666-16, ‘Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials’.

l. ASTM D3740-12a, ‘Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction’.
m. ASTM E114-15, ‘Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method’.
n. ASTM E164-13, ‘Standard Practice for Contact Ultrasonic Testing of Weldments’.
o. ASTM E329-18: ‘Standard Specification for Agencies Engaged in Construction Inspection and/or Testing’.
p. ASTM E488-18, ‘Standard Test Methods for Strength of Anchors in Concrete Elements'.
q. ASTM E543-15, ‘Standard Specification for Agencies Performing Nondestructive Testing’.
r. ASTM E587-15, ‘Standard Practice for Ultrasonic Angle-Beam Examination by the Contact Method’.
s. ASTM E709-15, ‘Standard Guide for Magnetic Particle Testing’.
t. ASTM E1212-17, ‘Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.
u. ASTM F710-17, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
v. ASTM F2170-18, ‘Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.

2. Code of Federal Regulations:
   a. 29 CFR 1910, Subpart A, Section 1910.7, ‘Definition and Requirements for a Nationally Recognized Testing Laboratory’.
3. International Code Council Code (IBC) (2018 or most recent edition adopted by AHJ):
   a. IBC Chapter 17, ‘Special Inspections And Tests’.
      1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
      2) Section 1705, ‘Required Special Inspection And Tests’.
         a) Section 1705.2, 'Steel Construction'.

1.4 SUBMITTALS

A. Informational Submittals:
   1. General: Additional submittal requirements are specified in Individual Sections in Division 01 through Division 50.
   2. Certificates:
      a. Testing Agency will submit certified written report of each inspection, test, or similar service.
   3. Tests and Evaluation Reports:
      a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies (or electronic record) distributed as follows:
         1) 1 copy to Owner’s Representative.
         2) 1 copy to Architect.
         3) 1 copy to Consulting Engineers (Engineer of Record).
         4) 1 copy to General Contractor.
         5) 1 copy to Authorities Having Jurisdiction (if required).
      b. Other tests, certificates, and similar documents will be obtained by Contractor and delivered to Owner’s Representative and Architect in such time as not to delay progress of the Work or final payment therefore.
      c. Submittal Format:
         1) Schedule of Tests and Inspections: Prepare in tabular form and include following:
            a) Specification Section number and title.
            b) Description of test and inspection.
            c) Identification of applicable standards.
            d) Identification of test and inspection methods.
            e) Number of tests and inspections required.
            f) Time schedule or time span for tests and inspections.
            g) Entity responsible for performing tests and inspections.
            h) Requirements for obtaining samples.
         2) Certified written reports of each inspection, test, or similar service will include, but not be limited:

a) Date of issue.
b) Project title and number.
c) Name, address, and telephone number of Testing Agency.
d) Dates and locations of samples and tests or inspections.
e) Names of individuals making tests and inspections.
f) Description of the Work and test and inspection method.
g) Identification of product and Specification Section.
h) Complete test or inspection data.
i) Test and inspection results and an interpretation of test results.
j) Record of temperature and weather conditions at time of sample taking and testing and inspecting.
k) Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.
l) Name and signature of laboratory inspector.
m) Recommendations on retesting and re-inspecting.

4. Source Quality Control Submittals:
   a. Testing Agency will submit following prior to commencing the Work:
      1) Qualifications of Testing Agency management and personnel designated to project.
      2) Testing Agency 'Written Practice for Quality Assurance'.
      3) Qualification records for Inspector and non-destructive testing technicians designated for project.
      4) Testing Agency non-destructive testing procedures, equipment calibration records, and personnel training records.
      5) Testing Agency Quality Control Plan for monitoring and control of testing operations.
      6) Welding Inspection Procedures (Structural Steel testing).
      7) Bolting Inspection Procedures (Structural Steel testing).
      8) Shear Connector Stud Inspection Procedures (Structural Steel testing).
      9) Seismic Connections Inspection Procedures (Structural Steel testing).

1.5 QUALITY ASSURANCE

A. Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.

B. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.

C. Certification:
   1. Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing.
   2. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.

D. Written Practice for Quality Assurance:
   1. Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel.
   2. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
   3. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

1.6 QUALITY CONTROL

A. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing and inspections, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.

B. Contractor will assign one (1) employee to be responsible for Quality Control. This individual may have other responsibilities and may be Contractor's Project superintendent or Contractor's Project Manager.

C. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and Owner's Representative within twenty four (24) hours of test or inspection having been performed.
   1. Testing and Inspection Reports will be distributed as follows:
      a. 1 copy to Owner's Representative.
      b. 1 copy to Architect.
      c. 1 copy to Consulting Engineer(s) (Engineer of Record).
      d. 1 copy to Authorities Having Jurisdiction (if required).

D. Contractor's Responsibility:
   1. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.
   2. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
   3. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
      a. Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
      b. Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
      c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
      d. Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
   4. Contractor will integrate Owner's independent Testing Agency services within Baseline Project Schedule and with other Project activities.
   5. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
   6. All Work is subject to testing and inspection and verification of correct operation prior to 100% payment to Contractor of line item(s) pertaining to that aspect of the Work.
   7. For Mechanical Equipment, inspection and documented approval of individual equipment and/or system(s) must be accomplished prior to requesting Substantial Completion Inspection for any area affected by said equipment and/or system:
      a. Contractor will perform thorough checkout of operations with manufacturer's representatives prior to requesting formal inspection by Owner.
      b. Contractor must notify Owner's Representative, in advance, as to when manufacturer's representative is scheduled to arrive at Site.
   8. Comply:
      a. Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
      b. Comply with Contract Documents in making such repairs.
   9. Data: Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
   10. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements:

a. Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid Work delays.
b. Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.
c. Contractor responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
d. Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
e. Should test return unacceptable results, Contractor will bear all costs of retesting and re-inspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.

11. Protection:
    a. Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.
12. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
    a. Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover Work for testing or inspection.
    b. Notify Testing Agency and Architect as noted in Sections in Division 01 through Division 50 prior to any time required for such services.
    c. Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
    d. Schedule sequence of activities to accommodate required services with minimum of delay.
    e. Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections
13. Test and Inspection Log:
    a. Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following:
        1) Date test or inspection was conducted.
        2) Description of the Work tested or inspected.
        3) Date test or inspection results were transmitted to Architect.
        4) Identification of Testing Agency or inspector conducting test or inspection.
    b. Maintain log at Project site:
        1) Post changes and modifications as they occur.
        2) Provide access to test and inspection log for Architect's reference during normal working hours.

1.7 TESTING AND INSPECTIONS - GENERAL

A. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.

B. Individual Sections in Division 01 through Division 49 indicate if Owner will provide testing and inspection of the Work of that Section.

C. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 49.

D. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
1. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements.
2. Contractor must cooperate with persons and firms engaged in these activities.

E. Taking Specimens:
1. Except as may be specifically otherwise approved by Architect, only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.

F. Scheduling Testing Agency:
   1. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
   2. Contractor will notify Testing Agency and Architect to schedule tests and / or inspections.

G. For ‘building-wide’ and/or life safety systems, such as emergency lighting, emergency power uninterruptible power supply systems, fire alarm, fire sprinkler systems, smoke evacuation systems, toxic gas monitoring, capturer exhaust systems, etc. formal start-up inspection will be completed prior to requesting Substantial Completion Inspection for any area of Project:
   1. Manufacturer's representatives and installing contractor will demonstrate both operation and compliance to Owner's agents and consultants. If coordinated and scheduled appropriately by Contractor, these equipment and/or systems inspections may also serve to provide required Owner training, if approved in advance by Owner.
   2. Contractor responsible for requesting that Architect arrange for inspection of materials, equipment, and work prior to assembly or enclosure that would make materials, equipment, or work inaccessible for inspection and at other times as may be required.

1.8 TESTING AGENCY SERVICES AND RESPONSIBILITIES

A. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located.
   1. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.

B. Testing and Inspection Services:
   1. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
   2. Testing Agency will not give direction or instruction to Contractor.
   3. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner’s Representative and/or Architect.
   4. Testing Agency will not provide additional testing and inspection services beyond scope of Work without prior approval of Owner’s Representative and / or Architect.

C. Excavation Support and Protection:
   1. Anchor tie-back System:
      a. Observe and record proof tests.
   2. Soil Nail Systems:
      a. Observe and record proof tests.
      b. Observe drilling for changes in soil type, hole diameter, length, and cleanliness.
      c. Periodically observe placement of drainage materials, reinforcing, and shotcrete.
      d. Review compressive strength test results of grout and shotcrete.

D. Testing Agency Duties:
   1. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
   2. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
   3. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
   4. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
   5. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
   6. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

7. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and will verify compliance with all reference standard requirements.

E. Testing and Inspection Reports:
   1. Conduct and interpret tests and inspections and state in each report whether tested and inspected the Work complies with or deviates from requirements.
   2. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
      a. Description of method of test.
      b. Identification of sample and portion of the Work tested.
         1) Description of location in the Work of sample.
         2) Time and date when sample was obtained.
         3) Weather and climatic conditions at time when sample was obtained.
      c. Evaluation of results of tests including recommendations for action.
   3. Inspection Reports:
      a. Testing Agency will furnish 'Inspection at Site' reports for each site visit documenting activities, observations, and inspections.
      b. Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
   4. Reporting Testing and Inspection (Conforming Work):
      a. Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
   5. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
      a. Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
         1) Verbally notify results to Architect, Contractor, and Owner's Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
         2) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
      b. Prepare non-compliance log to track non-compliant testing or inspections.
   6. Final Report:
      a. Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

1.9 ARCHITECT'S RESPONSIBILITIES

A. Architect Duties:
   1. Notify Owner's Representative before each test and/or inspection.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
   1. Field Tests and Inspections requirements are described in 'Field Quality Control' of individual Sections in Division 01 through Division 49.

END OF SECTION

SECTION 01 5100

TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Temporary Utilities.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Where necessary, engage appropriate local utility companies to install temporary service or connect to existing service. Where utility company provides only part of service, provide remainder with matching, compatible materials and equipment. Comply with utility company's recommendations.
   1. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction.
   2. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
   3. Arrange with utility company and existing users for time when service can be interrupted, where necessary, to make connections for temporary services.
   4. Provide adequate capacity at each stage of construction. Before temporary utility availability, provide trucked-in services.
   5. Obtain construction easements necessary to bring temporary and/or permanent utilities to site.
   6. Use qualified personnel for installation and maintenance of temporary facilities. Locate temporary utilities where they will serve Project adequately and result in minimum interference with the Work of Owner or other Contractors on Project Site. Relocate and modify temporary utilities as required.
   7. Pay cost and use charges for temporary and permanent utilities until Substantial Completion has been granted by Owner.

B. Prepare schedule indicating dates for implementation and termination of each temporary utility. At earliest feasible time, change over from use of temporary service to use of permanent service.

C. Keep temporary utilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload utilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.

D. Limit availability of temporary utilities to essential and intended uses to reduce waste and abuse.

E. Maintain temporary utilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
   2. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

F. Remove each temporary utility and control when need has ended, or when replaced by permanent utility, but not later than Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary utility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that make up temporary utilities are property of Contractor.

2. By Substantial Completion, clean and renovate permanent utilities used during construction period, including but not limited to:
   a. Replace air filters and clean inside of ductwork and housings.
   b. Replace significantly worn parts and parts subjected to unusual operating conditions.
   c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

1.3 TEMPORARY ELECTRIC POWER

A. Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period.

1.4 TEMPORARY FIRE PROTECTION

A. Install and maintain temporary fire protection facilities of types needed to protect against predictable and controllable fire losses. At a minimum, provide and maintain in working order two Standard UL Labeled ABC all-purpose 10 lb fire extinguishers. Do not incorporate these extinguishers into final Project.
   1. Locate fire extinguishers where convenient and effective for their intended purpose.
   2. Store combustible materials in containers in fire-safe locations.
   3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for fighting fires.
   4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
   5. At earliest feasible date in each area of Project, complete installation of permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

1.5 HEATING, COOLING, AND VENTILATING:

A. Install and operate temporary heating, cooling, and ventilating units including fuel, temporary piping, fittings, wiring, and connections necessary to provide environmental conditions specified for various portions of the Work. Coordinate ventilation requirements to produce ambient conditions required and reduce consumption of energy.

B. Repair damage to building and contents caused by cold, heat, dampness, and/or heating, cooling, and ventilating equipment. Select equipment that will not have harmful effect on completed installations or on elements being installed.

C. Maintain safe conditions for use of temporary heating, cooling, and ventilating systems including, but not limited to, following requirements:
   1. Operate equipment according to equipment manufacturer's instructions.
   2. Provide fresh air ventilation required by equipment manufacturer.
   3. Keep temperature of fuel containers stabilized.
   4. Secure fuel containers from overturning.
   5. Operate equipment away from combustible materials.

D. Permanent mechanical system may be operated subject to following conditions:
   1. Do not operate system when work causing air-borne dust is occurring or when dust caused by such work is present without installation of temporary filtering system approved by Architect.
   2. Operate system at no cost to Owner, including cost of fuel.
   3. Assume all responsibility and risk for operation of system.
   4. Return permanent mechanical equipment to 'like-new' condition for Substantial Completion Inspection.

1.6 TEMPORARY LIGHTING

A. Install and operate temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

1.7 TEMPORARY TELEPHONES

A. Provide temporary telephone service for all personnel engaged in construction activities, throughout construction period.

B. Contractor will pay for Local calls. Party making call will pay for long-distance and toll calls.

C. At each telephone, post list of important telephone numbers.

1.8 TEMPORARY WATER SERVICE

A. Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5200

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Construction Facilities.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Prepare schedule indicating dates for implementation and termination of each temporary facility.

B. Keep temporary facilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.

C. Maintain facilities in good operating condition until removal.

D. Remove each temporary facility when need has ended, or when replaced by authorized use of permanent facility, or by Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that make up temporary facilities are property of Contractor.
   2. By Substantial Completion, clean and renovate permanent facilities used during construction period.

1.3 FIELD OFFICES

A. Provide and maintain insulated, weather tight temporary office of sufficient size to accommodate Contractor's personnel at Project site and for use by Owner, Architect and Subcontractors.
   1. Keep office clean and orderly.
   2. Heat and cool office as needed.
   3. Furnish office with locking door, light(s), table(s), bench(es), rack(s) for drawings, telephone, and FAX machine.
   4. Make office available for progress meetings.
   5. Provide an operable fire extinguisher in facility.
   6. Provide hardhats for Owner’s Representatives for site visits.

B. If Owner agrees to permit removal of temporary office before Substantial Completion, Contractor may use a room as an office after temporary office is removed. Equip room as specified above and restore to 'like-new' condition before Substantial Completion.

1.4 SANITARY FACILITIES

A. Provide temporary sanitary toilet. Service and maintain temporary toilet in a clean, sanitary condition.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5400

CONSTRUCTION AIDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Construction Aids.

1.2 SCAFFOLDING, PLATFORMS, STAIRS, ETC

A. Furnish and maintain equipment such as temporary stairs, ladders, ramps, platforms, scaffolds, hoists, runways, derricks, chutes, and elevators as required for proper execution of The Work.

B. Apparatus, equipment, and construction shall meet requirements of applicable laws and safety regulations.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5600

TEMPORARY BARRIERS AND ENCLOSURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Temporary Barriers and Enclosures.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Protection Of Existing Improvements: Protect streets, private roads, and sidewalks, including overhead protection where required. Repair damage to existing improvements caused by construction activities.

B. Protection Of Adjacent Property: Provide necessary protection for adjacent property and lateral support thereof.

C. Proprietary Camera Services: In its absolute discretion, and with or without notice to Contractor, Owner may provide from time to time, but is not obligated to provide, one or more cameras on or about Project site and/or signage or notices of the same:
   1. If provided by Owner, such camera(s) and/or signage and notices are solely for Owner's benefit and convenience and shall not be for benefit of Contractor, Subcontractor(s) or for any third person.
   2. Owner shall have no liability, obligation, or responsibility to Contractor, Subcontractors, or any third person relative to such camera(s), signage, or notices, or absence of camera(s), signage, or notices, including without limitation, installation, maintenance, operation, repair, testing, functionality, capacity, recording, monitoring, posting, etc., of the same (hereafter 'Proprietary Camera Services').
   3. Contractor, with Owner's prior consent (which shall not be unreasonably withheld), may relocate such camera(s), signage, or notices as necessary to not unreasonably, materially and physically interfere with work at Project Site.
   4. Contractor's obligations under Contract Documents, including but not limited to, Contractor's obligation for security of Project Site, are not modified by Owner's opportunity to provide, actually providing, or not providing Proprietary Camera Services and/or signage or notices regarding the same.
   5. This Specification Section does not preclude Contractor from providing its own camera(s), signage, or notices pursuant to terms and conditions of this Agreement. Neither does this Section reduce, expand or modify any other right or obligation of Owner pursuant to terms of this Agreement.

1.3 TEMPORARY DUST BARRIERS

A. At vestibule between old and new construction.

1.4 TEMPORARY BARRICADES

A. Comply with standards and code requirements in erecting barricades, warning signs, and lights.

B. Take necessary precautions to protect persons, including members of the public, from injury or harm.

1.5 TEMPORARY FENCING

A. Before construction begins, install 6 foot high enclosure fence with lockable entrance gates. Locate where shown on Drawings. If not shown on Drawings, enclose entire site or portion sufficient to accommodate construction operations.

1.6 TEMPORARY SECURITY BARRIERS

A. Install temporary enclosures of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and other violations of security.

B. Secure materials and equipment stored on site.

C. Secure building at the end of each work day.

D. Maintain exterior building security until Substantial Completion.

1.7 TEMPORARY TREE AND PLANT PROTECTION

A. Protection:
   1. Before commencing site work, build and maintain protective fencing around existing trees and vegetation as shown on the drawings.
   2. Individual trees will have protective fencing built beyond drip line.
   3. Build protective fencing around groups of trees and other vegetation as indicated on Drawings.
   4. Keep areas within protective fencing undisturbed and do not use for any purpose.

B. Maintenance:
   1. Maintain existing tree, shrubs, and vegetation as indicated in Contract Documents:
      a. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
      b. Damage to any tree, shrub, or vegetation that has been indicated to remain and be protected, will be replaced by contractor as required.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5700

TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Temporary Controls.

1.2 TEMPORARY EROSION AND SEDIMENT CONTROL

A. Take precautions necessary to prevent erosion and transportation of soil downstream, to adjacent properties, and into on-site or off-site drainage systems.

B. Develop, install, and maintain an erosion control plan if required by law.

C. Repair and correct damage caused by erosion.

1.3 TEMPORARY ENVIRONMENTAL CONTROLS

A. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and reduce possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result:
   1. Avoid use of tools and equipment that produce harmful noise.
   2. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near site.

B. Provide protection against weather (rain, winds, storms, frost, or heat) to maintain all work, materials, apparatus, and fixtures free from injury or damage.

C. Protect excavation, trenches, and building from damage from rain water, spring water, ground water, backing up of drains or sewers, and all other water:
   1. For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with requirements of applicable local regulations. Where feasible, use permanent facilities.
   2. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.

D. Comply with governing ordinances relating to weed control and removal.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5800

PROJECT IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Project Identification.

1.2 TEMPORARY PROJECT SIGNAGE

A. Contractor may, at its option, erect a temporary project identification sign.
   1. Sign may be free-standing or attached to temporary field office or storage shed.
   2. No other signs or advertisements are allowed on building site.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 6100

COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Common Product Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Provide products that comply with Contract Documents, that are undamaged, and, unless otherwise indicated, new and unused at time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

B. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on building exterior.
   1. Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
   2. Provide permanent nameplates on items of service-connected or power-operated equipment. Locate on easily accessible surface that is inconspicuous in occupied spaces. Nameplate will contain following information and other essential operating data:
      a. Name of product and manufacturer.
      b. Model and serial number.
      c. Capacity.
      d. Speed.
      e. Ratings.

C. Where specifications describe a product or assembly by specifying exact characteristics required, with or without use of brand or trade name, provide product or assembly that provides specified characteristics and otherwise complies with Contract requirements.

D. Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application described. General overall performance of product is implied where product is specified for specific application. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.

E. Where specifications only require compliance with an imposed code, standard, or regulation, select product that complies with standards, codes or regulations specified.

F. Where Specifications require matching an established Sample, Architect's decision will be final on whether proposed product matches satisfactorily. Where no product available within specified category matches satisfactorily nor complies with other specified requirements, refer to Architect.

G. Where specified product requirements include phrase ` . . . *as selected from manufacturer's standard colors, patterns, textures* . . . ' or similar phrase, select product and manufacturer that comply with other specified requirements. Architect will select color, pattern, and texture from product line selected.

H. Remove and replace products and materials not specified in Contract Documents but installed in the Work with specified products and materials at no additional cost to Owner and for no increase in Contract time.

I. Informational Submittals:
   1. Sustainable Design Submittals:
      a. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
      b. Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 6200

PRODUCT OPTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Product Options.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Product Selection:
   1. When option of selecting between two or more products is given, product selected will be compatible with products previously selected, even if previously selected products were also options.
      a. Regional materials.

B. Non-Conforming Work:
   1. Non-conforming work as covered in Article 12.3 of General Conditions applies, but is not limited, to use of non-specified products or manufacturers.

C. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:
   1. Substitutions And Equal Products:
      a. Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
      b. Approved Products / Manufacturers / Suppliers / Distributors / Fabricators / Installers:
         1) Category One:
            a) Owner has established ‘Relationships’ that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
            b) Specification Sections specify Owner Furnished and Owner Installed Manufacturers or Products.
            c) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
         2) Category Two:
            a) Owner has established ‘Relationships' that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
            b) Specification Sections specify Owner Furnished and Contractor Installed Manufacturers, Suppliers, Distributors or Products.
            c) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
         3) Category Three:
            a) Owner has established ‘Relationships' that contain provisions extending beyond requirements of this Project. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.
            b) Specification Sections specify Contractor Furnished and Contractor Installed Manufacturers, Suppliers, Distributors, Fabricators or Products.
         4) Category Four:

a) Provide only specified products available from manufacturers listed. No substitutions, private-labeled, or equal products, or mixing of manufacturers' products is allowed on this Project.
b) In Sections where lists recapitulating Manufacturers previously mentioned in Section are included under heading '*Manufacturers*' or '*Approved Manufacturers*', this is intended as a convenience to Contractor as a listing of contact information only. It is not intended that all manufacturers in list may provide products where specific products and manufacturers are listed elsewhere in Section.

c. Acceptable Products / Manufacturers / Suppliers / Installers:
1) Type One: Use specified products / manufacturers unless approval to use other products / manufacturers has been obtained from Architect by Addendum.
2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect in writing before installing or applying unlisted or private-labeled products.
3) Use 'Equal Product Approval Request Form' to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections.

d. Quality / Performance Standard Products / Manufacturers:
1) Class One: Use specified product / manufacturer or equal product from specified manufacturers only.
2) Class Two: Use specified product / manufacturer or equal product from any manufacturer.
3) Products / manufacturers used shall conform to Contract Document requirements.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 6600

PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Product Delivery, Storage, and Handling Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1.3 DELIVERY AND ACCEPTANCE REQUIREMENTS

A. Schedule delivery to reduce long-term storage at site and to prevent overcrowding of construction spaces.

B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

C. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

D. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.

1.4 STORAGE AND HANDLING REQUIREMENTS

A. Store products at site in manner that will simplify inspection and measurement of quantity or counting of units.

B. Store heavy materials away from Project structure so supporting construction will not be endangered.

C. Store products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 7300

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for governing Execution of the Work.

1.2 COMMON INSTALLATION PROVISIONS

A. Manufacturer's Instructions: Comply with Manufacturer's installation instructions and recommendations to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Notify Architect of conflicts between Manufacturer's installation instructions and Contract Document requirements.

B. Provide attachment and connection devices and methods necessary for securing Work. Secure work true to line and level. Anchor each product securely in place, accurately located, and aligned with other Work. Allow for expansion and building movement.

C. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer questionable choices to Architect for final decision.

D. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.

E. Coordinate temporary enclosures with required inspections and tests, to reduce necessity of uncovering completed construction for that purpose.

F. Mounting Heights: Where mounting heights are not shown, install individual components at standard mounting heights recognized within the industry or local codes for that application. Refer questionable mounting height decisions to Architect for final decision.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 7400

CLEANING AND WASTE MANAGEMENT

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Administrative and procedural requirements for Cleaning and Waste Management as described in Contract Documents.

B. Related Requirements:
   1. Section 01 1200: Coordination of responsibilities for waste management.
   2. Section 01 6400: Waste removal of Owner furnished products.
   3. In addition to standards described in this section, comply with all requirements for cleaning-up as described in various other Sections of these Specifications.

1.2 REFERENCES

A. Definitions:
   1. Asphalt Pavement, Brick, and Concrete (ABC) Rubble: Rubble that contains only weathered (cured) asphalt pavement, clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waster or debris.
   2. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
   3. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
   4. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
   5. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
   6. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
   7. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

PART 2 - EXECUTION

2.1 PROGRESS CLEANING

A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.

B. Keep premises broom clean during progress of the Work.

C. Keep site and adjoining streets reasonably clean. If necessary, sprinkle rubbish and debris with water to suppress dust.

D. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.

E. Clean and maintain completed construction as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure ability to operate without damaging effects.

F. Supervise construction activities to ensure that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

G. Before and during application of painting materials, clear area where such work is in progress of debris, rubbish, and building materials that may cause dust. Sweep floors and vacuum as required and take all possible steps to keep area dust free.

H. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.

I. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.

J. Construction Waste Management And Disposal:
   1. Remove waste materials and rubbish caused by employees, Subcontractors, and contractors under separate contract with Owner and dispose of legally. Remove unsuitable or damaged materials and debris from building and from property.
      a. Provide adequate waste receptacles and dispose of materials when full.
      b. Properly store volatile waste and remove daily.
      c. Do not deposit waste into storm drains, sanitary sewers, streams, or waterways. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
   2. Do not burn waste materials or build fires on site. Do not bury debris or excess materials on Owner's property.

2.2 FINAL CLEANING

A. Immediately before Substantial Completion, thoroughly clean building and area where The Work was performed. Remove all rubbish from under and about building, landscaped areas and parking lot and leave building and Project Site ready for occupancy by Owner.

B. Comply with individual manufacturer's cleaning instructions.

C. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program, including but not limited to:
   1. Interior Cleaning:
      a. Clean inside glazing, exercising care not to scratch glass.
      b. Remove marks, stains, fingerprints and dirt.
      c. Clean and polish woodwork and finish hardware.
      d. Remove labels that are not permanent labels.
      e. Clean plumbing fixtures and tile work. Remove spots, soil or paint.
      f. Clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
      g. Clean other fixtures and equipment and remove stains, paint, dirt, and dust.
      h. Remove temporary floor protection and clean floors.
   2. Exterior Cleaning:
      a. Clean outside glazing, exercising care not to scratch glass.
      b. Remove marks, stains, and dirt from exterior surfaces.
      c. Clean and polish finish hardware.
      d. Remove temporary protection systems.
      e. Clean dirt, mud, and other foreign material from paving, sidewalks, and gutters.
      f. Clean drop inlets, through-curb drains, and other drainage structures.
      g. Remove trash, debris, and foreign material from landscaped areas.

END OF SECTION

SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Closeout Procedures.

1.2 GENERAL

A. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.

B. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.

C. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect and included on Certificate of Substantial Completion.

1.3 PRELIMINARY CLOSEOUT REVIEW

A. When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.

B. Prior to this inspection, completed test and evaluation reports for HVAC system and font, where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.

C. Architect and his appropriate consultants, together with Contractor and mechanical, plumbing, fire protection, and electrical sub-contractors shall conduct a space by space and exterior inspection to review materials and workmanship and to demonstrate that systems and equipment are operational.
   1. Punch list of items requiring completion and correction will be created.
   2. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

1.4 SUBSTANTIAL COMPLETION INSPECTION

A. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.

B. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.

C. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
   1. Date of Substantial Completion.
   2. Punch List Work not yet completed, including seasonal and long lead items.

3. Amount to be withheld for completion of Punch List Work.
4. Time period for completion of Punch List Work.
5. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.

D. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.

1.5 FINAL ACCEPTANCE MEETING

A. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.

B. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
1. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
2. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
3. Final cleaning requirements have been completed.

C. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout - Final Acceptance form.

D. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 7800

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But is Not Limited To:
   1. Administrative and procedural requirements for Closeout Submittals.

B. Related Requirements:
   1. Section 01 3300: 'Submittal Procedures' for administrative and procedural requirements for submittal procedures.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Project Record Documents:
   1. Do not use record documents for construction purposes:
      a. Protect from deterioration and loss in secure, fire-resistive location.
      b. Provide access to record documents for Architect's reference during normal working hours.
   2. Maintain clean, undamaged set of Drawings:
      a. Mark set to show actual installation where installation varies from the Work as originally shown.
      b. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
      c. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
      d. Mark new information that is important to Owner, but was not shown on Drawings.
      e. Note related Change Order numbers where applicable.

B. As Built Record Drawings:
   1. As required in agreement with the Owner:
      a. Architect will provide two full-size sets of prints of the As Built Record Drawings to the Facilities Management Office, printed from the updated AutoCAD drawing files or updated Revit model files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner.
      b. Architect will submit following:
         1) Updated AutoCAD as built record drawing files with associated plot style tables or Revit as built record model files, as specified by Owner.
         2) Revit Model O&M lifecycle requirements to be tracked by Facility Manager.

1.3 CLOSEOUT SUBMITTALS

A. Operations And Maintenance Manual:
   1. General:
      a. Include closeout submittal documentation as required by Contract Documentation.
      b. Include workmanship bonds, final certifications, equipment check-out sheets, and similar documents.
      c. Releases enabling Owner unrestricted use of The Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
      d. Include Project photographs, damage or settlement survey, and similar record information required by Contract Documents.

e. Submittal Format:
   1) Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
   2) Include only closeout submittals as defined in individual specification section as required in Contract Documents.

2. Project Manual:
   a. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
      1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
      2) Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
3. Maintenance Contracts:
   a. Digital format only.
4. Operations and Maintenance Data:
   a. Digital format only:
      1) Cleaning instructions.
      2) Maintenance instructions.
      3) Operations instructions.
      4) Equipment list.
      5) Parts list.
5. Warranty Documentation:
   a. Digital format of final, executed warranties.
6. Record Documentation:
   a. Digital format only.
      1) Certifications.
      2) Color and pattern selections.
      3) Design Data.
      4) Geotechnical Evaluation Reports (soils reports).
      5) Manufacture Reports.
      6) Manufacturer's literature or cut sheets.
      7) Shop Drawings.
      8) Source Quality Control.
      9) Special Procedures.
      10) Testing and Inspection Agency Reports.
      11) Testing and Inspection Reports.
7. Software:
   a. Audio and Video System software, programming and set-files.
8. Irrigation Plan.
   a. Laminated and un-laminated reduced sized hard copies.
9. Landscape Management Plan (LMP):
   a. Irrigation Section:
      1) Submittal Format: Digital format and hard copy of each.
      2) Documentation required by sections under 32 8000 Heading: 'Irrigation'.
   b. Landscaping Section:
      1) Submittal Format: Digital format and hard copy of each.
      2) Documentation required by sections under 32 9000 Heading: 'Planting'.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Submit item(s) required by Section 01 3300 'Submittal Procedures' and as defined in individual specification section if required in Contract Documents. Items may be provided at completion of Work or with Closeout Submittals.

1.5 WARRANTIES

A. When written guarantees beyond one (1) year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manual(s) specified above.

B. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

DIVISION 02: EXISTING CONDITIONS

02 4000 DEMOLITION AND STRUCTURE MOVING

02 4119 SELECTIVE STRUCTURE DEMOLITION

END OF TABLE OF CONTENTS

SECTION 02 4113

SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Demolish and remove portions of existing site facilities as described in Contract Documents.

B. Related Requirements:
   1. New and replacement work specified in appropriate specification Sections.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
   1. Include on Construction Schedule specified in Section 01 3200 detailed sequence of individual site demolition operations.

1.3 SUBMITTALS

A. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Identify abandoned utility and service lines and capping locations on record drawings.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Demolition of existing parking lot, concrete sidewalks and curbs where shown on construction documents.

3.2 PREPARATION

A. Notify corporations, companies, individuals, and local authorities owning conduits running to property.
   1. Protect and maintain conduits, drains, sewers, pipes, and wires that are to remain on the property.
   2. Arrange for removal of wires running to and on property. Remove pipes and sewers in accordance with instructions of above owners.

3.3 PERFORMANCE

A. Execute work in orderly and careful manner, with due consideration for neighbors and the public.

B. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work. Coordinate with Owner for equipment and materials to be removed by Owner.

C. Concrete And Paving Removal:
   1. Saw cut joints between material to be removed and material to remain to full depth.
   2. Hand-excavate trench 12 inches (300 mm) wide and 16 inches (400 mm) deep along concrete or paving to be removed. Cut roots encountered with saw, axe, or pruner. Do not cut roots with excavating equipment. Remove roots under concrete and paving to be replaced down to 12 inches (300 mm) below finish grade.

3.4 CLEANING

A. Keep streets and roads reasonably clean, and sweep daily.

B. Sprinkle demolition rubbish and debris as necessary to lay dust.

C. Promptly remove demolition materials, rubbish, and debris from property.

END OF SECTION

DIVISION 03: CONCRETE

03 3000 CAST-IN-PLACE CONCRETE

03 3053 MISCELLANEOUS EXTERIOR CAST-IN-PLACE CONCRETE
03 3111 CAST-IN-PLACE STRUCTURAL CONCRETE
03 3923 MEMBRANE CONCRETE CURING

END OF TABLE OF CONTENTS

SECTION 03 3053

MISCELLANEOUS EXTERIOR CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
1. Compact aggregate base for miscellaneous cast-in-place concrete as described in Contract Documents.
2. Furnish and install miscellaneous cast-in-place concrete and equipment pads as described in Contract Documents.
3. Furnish and install sealants and curing compounds as described in Contract Documents.

B. Related Requirements:
1. Section 01 0000: ‘General Requirements’:
   a. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
   b. Section 01 3100: ‘Project Management and Coordination’ for pre-installation conference.
   c. Section 01 4000: ‘Quality Requirements’ for administrative and procedural requirements for quality assurance and quality control.
   d. Section 01 4301: ‘Quality Assurance – Qualifications’ establishes minimum qualification levels required.
   e. Section 01 4523: ‘Testing and Inspecting Services’ for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   f. Section 01 7800: ‘Closeout Submittals’.
2. Section 03 1113: ‘Structural Cast-In-Place Concrete Forming’.
3. Section 03 3111: ‘Normal Weight Structural Concrete’ for:
   a. Concrete mix information and use admixtures.
   b. Field Quality Control Testing and Inspection requirements for concrete.
   c. Pre-installation conference held jointly with other concrete related sections.
4. Section 03 3923: 'Membrane Concrete Curing' for application.
5. Section 07 9213: 'Elastomeric Joint Sealant' for quality of sealants.
6. Section 31 0501: ‘Common Earthwork Requirements’ for:
   a. General procedures and requirements for earthwork.
   b. Pre-installation conference held jointly with other common earthwork related sections.
7. Section 31 1123: 'Aggregate Base' for installation of aggregate base.
8. Section 31 2213: ‘Rough Grading’ for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
9. Section 31 2323: 'Fill' for compaction procedures and tolerances.
10. Section 32 8423: 'Underground Sprinklers' for sleeves for underground irrigation system.

1.2 REFERENCES

A. Association Publications:
1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
   a. ACI 224R-01, ‘*Control of Cracking in Concrete Structures*’.
   b. ACI 224.1R-07, ‘*Causes, Evaluation, and Repair of Cracks in Concrete Structures*’.
   c. ACI 224.2R-92(R2004): ‘*Cracking of Concrete Members in Direct Tension*’.
   d. ACI 224.3R-95(R2013), ‘*Joints in Concrete Construction*’.
   e. ACI 302.1R-04: ‘*Guide for Concrete Floor and Slab Construction*'.
   f. ACI 305R-10, ‘Guide to Hot Weather Concreting’.
   g. ACI 306R-10, ‘Guide to Cold Weather Concreting’.

2. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).

B. Definitions:
1. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.

C. Reference Standards:
1. American Concrete Institute:
a. ACI 117-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary'.
b. ACI 117M-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary (Metric)'.
c. ACI 301-10, 'Specification for Structural Concrete'.
d. ACI 305.1-06, 'Specification for Hot Weather Concreting'.
e. ACI 306.1-90(R2002), 'Standard Specification for Cold Weather Concreting'.
f. ACI 318-11, 'Building Code Requirements for Structural Concrete and Commentary'.
2. ASTM International:
a. ASTM D1751-04(2013), 'Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)'.
b. ASTM E329-13b: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
3. International Code Council (IBC):
a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
1. Participate in pre-installation conference as specified in Section 03 3111:
a. Schedule concrete site element pre-installation conference after installation of sleeves, placing of aggregate base, and installation of forms, but before placing of concrete.
b. In addition to agenda items specified in Section 01 3100 and Section 03 3111, review following:
1) Review installation scheduling, coordination, and placement of concrete.
2) Review approved mix design and use of admixtures.
3) Review 'Verification Of Conditions' requirements.
4) Review placement, finishing, and curing of concrete including cold and hot weather requirements.
5) Review smooth rubbed concrete finish procedures and requirements (applied immediately after removing concrete formwork while concrete is "green").
6) Review joint layout plan for control and expansion joints for sidewalks, curbs, and gutters.
7) Review layout plan, scheduling, coordination, and placement requirements of detectable warning panels.
8) Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
c. Review frequency of testing and inspections.
2. Participate in pre-installation conference as specified in Section 31 0501.
a. In addition to agenda items specified in Section 01 3100, and 31 0501, review following:
1) Review proposed miscellaneous exterior concrete schedule.

B. Scheduling:
1. Notify Testing Agency and Architect twenty four (24) hours minimum before placing concrete for exterior site work concrete (sidewalks, curbs, gutters, etc.).

1.4 SUBMITTALS

A. Action Submittals:
   1. Joint layout plan for control and expansion joints for sidewalks, curbs, and gutters for written approval before starting work on this Section.
   2. Detectable warning panels:
      a. Layout plan and joints location for written approval before starting work on this Section.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Testing and Inspection Reports:
            a) Testing Agency Testing and Inspecting Reports of concrete for exterior site work.

1.5 QUALITY ASSURANCE

A. Testing and Inspection.
   1. Owner will provide Testing and Inspection for concrete for exterior site work:
      a. See Section 01 1200: 'Multiple Contract Summary'.

1.6 FIELD CONDITIONS

A. Ambient Conditions:
   1. Cold Weather Limitations:
      a. Follow requirements of ACI 306 for cold weather concreting.
   2. Hot Weather Limitations:
      a. Follow requirements of ACI 305 for hot weather concreting.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:
   1. Concrete:
      a. Meet requirements specified in Section 03 3111 for exterior concrete.

2.2 ACCESSORIES

A. Formwork:
   1. Meet requirements specified in Section 03 1113.

B. Expansion Joint Material:
   1. 1/2 inch (12.7 mm) thick.
   2. Manufactured commercial fiber type:
      a. Meet requirements of ASTM D1751.
      b. Type Two Acceptable Products:
         1) Conflex by Knight-Celotex, Northfield, IL www.aknightcompany.com.
         2) Sealtight by W R Meadows Inc, Hampshire, IL www.wrmeadows.com.
         3) Equal as approved by Architect before installation. See Section 01 6200.

C. Finishing Material:
   1. Finishing Material available in multiple concrete shades to closely match concrete surface.
   2. Type Two Acceptable Products:

a. Mixture of 1 part cement (using same cement as used in concrete foundations), 1 part sand with 95% passing #50 sieve.
b. RapidSet WunderFixx by CTS Cement Manufacturing Corporation, Cypress, CA www.rapidset.com.
c. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Concrete Forms:
a. Verify dimensions and spot elevations for locations of forms for concrete footings, stem walls, building slabs, curbs, gutters, walkways, and drainage systems are correct before concrete is placed.
1) Notify Architect of incorrect dimensions or spot elevations in writing.
2) Do not place concrete until corrections are made and verified.
2. Detectable Warning Panels:
a. Examine substrate and verify substrate is suitable for installation of detectable warning panels:
1) Notify Architect of unsuitable conditions in writing.
2) Do not install detectable warning panels over unsuitable conditions.
3) Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Surface Preparation:
1. Aggregate base and subgrade:
a. Prepare aggregate base as specified in Section 31 1123.
b. Prepare natural soil subgrade as specified in Section 31 2213.
c. Prepare fill subgrade as specified in Section 31 2323.

B. Concrete Slab Thickness:
1. Increase thickness of concrete beneath detectable warning panels one inch (25 mm).

3.3 INSTALLATION

A. General:
1. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.

B. Sidewalks, Exterior Stairs, And Landings:
1. Slope with cross slope of 1/8 to 1/4 inch per ft (3 to 6 mm per 300 mm) (one to two percent) in direction of intended drainage.
2. Slope away from building 1/8 to 1/4 inch per ft (3 to 6 mm per 300 mm) (one to two percent) minimum.
3. Do not dust with cement.
4. Concrete walks shall be screeded to bring surface to grades and lines as indicated. Surface shall be floated with wood float with no coarse aggregate showing and then given broom finish before concrete sets.

C. Mow Strips and Aprons:
1. Aggregate base not necessary under mow strips and aprons.
2. Form and cast mow strips in place.
3. Set top of mow strip above finish grade as follows:

a. Sodded Areas: 2 inches (50 mm) below.
b. Seeded Areas: One inch (25 mm) below.
c. Ground Cover Areas: 2 inches (50 mm) below.
d. Trees and Shrub Areas (not individual trees): 4 inches (100 mm) below.

4. Compact topsoil underneath mow strips and aprons to density of undisturbed earth.

D. Light Pole Bases, Mow Strips, and Aprons:
1. Install bond breaker consisting of three layers of 30 lb (13.6 kg) roofing felt between pole base and adjoining sidewalk, mow strip and building foundations, and aprons and building foundations.

E. Pipe Bollards:
1. Install plumb and fill with concrete.

F. Detectable Warning Panels:
1. Follow Manufacturer's recommendations on following:
a. Temperature requirements.
b. Expansion and control joint requirements.
c. Installation of panels.
d. Curing of panels.

G. Joints:
1. Control Joints:
a. Control joints in Concrete Paving are specified in Section 32 1313.
b. Depth of control joints shall be approximately one quarter of concrete slab thickness, but not less than one inch (25 mm).
c. Control joints to be hand tooled in sidewalks, curbs and gutters, mow strips, and aprons.
d. Spacing On Center (+/-):

Sidewalks	4 feet to 6 feet	12 meters to 18 meters
Curbs and Gutters	10 feet	3.0 meters
Mow Strips	3 feet to 5 feet	0.90 meters to 1.50 meters
Flat Drainage Structures	10 feet	3 meters

2. Expansion Joints:
a. Expansion joints in Concrete Paving are specified in Section 32 1313.
b. Install so top of expansion joint material is 1/4 inch (6 mm) below finished surface of concrete.
c. No expansion joint required between curbs and sidewalks parallel to curb.
d. Provide expansion joints at ends of exterior site concrete elements that are perpendicular to and terminate at curbs, building foundations or other concrete elements (i.e. sidewalks, mow strips, aprons).
e. Provide expansion joints between sidewalks that are parallel, and adjacent, to the storage building or main building.
f. Provide expansion joints around perimeter of concrete slab on grade at mechanical enclosure, around perimeter of slab on grade at dumpster enclosure and at top and bottom of exterior stairs.
g. Spacing On Center (+/-):

Sidewalks, Curbs and Gutters	40 feet to 100 feet	12 meters to 30 meters
Mow Strips and Aprons	20 feet to 40 feet	6 meters to 12 meters
Flat Drainage Structures	50 feet	15 meters

h. Seal expansion joints as specified in Section 07 9213 for following areas:
1) Between entryway slabs and building foundations.
2) Between sidewalks and building foundations.
3) Within curbs and gutters.
4) Within flat drainage structures and at joints between flat drainage structures and other concrete elements.
i. Expansion joints are not required to be sealed for following areas:

1) Within aprons and where apron abuts sidewalks.
2) Within mow strips and where mow strip abuts building foundation and sidewalks.
3) Within sidewalks.

H. Finish:
1. Flatwork:
a. Curb, Gutter Sidewalks, Mow Strips, Flat Drainage Structures, Stairs, And Miscellaneous:
1) After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
a) Provide fine hair finish where grades are less than 6 percent 1-1/4 inch (32 mm).
b) Provide rough hair finish where grades exceed 6 percent 1-1/4 inch (32 mm).
c) Broom finish, by drawing broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide fine line texture acceptable to Architect. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
d) On inclined slab surfaces, provide coarse, non-slip finish by scoring surface with stiff-bristled broom, perpendicular to line of traffic. At curb and gutter, apply broom finish longintudinal to curb and gutter flowline.
e) Do not remove forms for twenty four (24) hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.
f) Round edges exposed to public view to 1/2 inch (13 mm) radius, including edges formed by expansion joints.
g) Remove edger marks.
b. Concrete Paving Finish is specified in Section 32 1313.
2. Vertical Surfaces (Exposed To View Vertical Surfaces, Exposed Retaining Walls, Exposed Foundation Walls, Concrete Piers, and etc.):
a. General:
1) Finishing Material to fill and smooth interior and exterior concrete surface defects such as spalls, gouges, cracks, dents, chips, bug holes, stone pockets, honeycombs, voids and other defective areas.
2) Chamfer lines shall be finished.
b. Surface Preparation:
1) Formwork shall be stripped from concrete while concrete is still “green”.
2) Concrete surface to be finished immediately after formwork has been removed.
a) Immediately after removing forms, remove joints, marks, bellies, projections, loose materials and other irregularities, and cut back metal ties from surfaces to be exposed.
b) Repair defective areas and voids or stone pockets with Finishing Material and smooth to even surface matching surrounding undamaged area.
c. Smooth Rubbed Finish:
1) Thoroughly wet with water, apply Finishing Material in thin layer, rub in circular motion to smooth uniform finish.
2) Entire surface shall be protected from rapid drying for not less than three (3) days.
3) Surfaces shall be cleaned of drip marks and discolorations.
4) Concrete surface shall be left with clean, neat, uniform finish, free from form markings and shall be uniform in color and texture.
d. Exposed portion to have smooth rubbed finish as specified in Vertical Surfaces in previous paragraph.

3.4 APPLICATION

A. Interface With Other Work:
1. Membrane Curing Compound:
a. Apply product specified in Section 03 3923 to curbs, gutters, sidewalks, flat drainage structures, stairs, landings, and pads.

3.5 FIELD QUALITY CONTROL

A. Field Tests and Inspections:
   1. Concrete:
      a. Testing Agency shall provide testing and inspection for Miscellaneous Exterior Concrete. See Section 03 3111 for Testing and Inspection requirements.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.

3.6 CLEANING

A. General:
   1. Detectable Warning Panels:
      a. Clean the panel in accordance with Manufacturer’s cleaning instructions.

3.7 PROTECTION

A. General:
   1. Protect concrete that has not received its initial set from precipitation to avoid excess water in mix and unsatisfactory surface finish.

B. Detectable Warning Panels:
   1. Protect installed panels from damage and until completion of project.
   2. Protect installed panels from traffic until desired concrete strength is achieved.

END OF SECTION

SECTION 03 3111

NORMAL WEIGHT STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install Project concrete work as described in Contract Documents.
   2. Quality of concrete used on Project but furnished under other Sections.

B. Products Installed But Not Furnished Under This Section:
   1. Inserts, bolts, boxes, templates, and fastening devices for other work, including those for bases only for Mechanical and Electrical.
   2. Concrete accessories.

C. Related Requirements:
   1. Pre-installation conference held jointly with Section 31 3111 as described in Administrative Requirements on Part 1 of this specification section.
   2. Section 01 0000: ‘General Requirements’:
      a. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
      b. Section 01 3100: ‘Project Management and Coordination’ for pre-installation conference.
      c. Section 01 4000: ‘Quality Requirements’ for administrative and procedural requirements for quality assurance and quality control.
      d. Section 01 4301: ‘Quality Assurance – Qualifications’ establishes minimum qualification levels required.
      e. Section 01 4523: ‘Testing and Inspecting Services’ for testing and inspection, and testing laboratory services for materials, products, and construction methods.
      f. Section 01 7800: ‘Closeout Submittals’.
   3. Section 03 3923: ‘Membrane Concrete Curing’.
   4. Section 31 1123: 'Aggregate Base' for aggregate base under miscellaneous cast-in-place concrete and exterior slabs, under interior slabs-on-grade concrete, and asphalt paving.
   5. Section 31 2213: ‘Rough Grading’ for grading and preparation of natural soil subgrades below fill and aggregate base materials.
   6. Section 31 2216: 'Fine Grading' for grading of subgrade below aggregate base and topsoil.
   7. Section 31 2323: 'Fill' for compaction procedures and tolerances.
   8. Section 32 9121: ‘Topsoil Grading’ for grading of subgrade below topsoil.
   9. Furnishing of items to be embedded in concrete specified in Section involved.

1.2 REFERENCES

A. Association Publications:
   1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
      a. ACI 214.3R-88(97), *'Recommended Practice for Evaluation of Strength Test Results of Concrete*.
      b. ACI 224R-01, ‘*Control of Cracking in Concrete Structures*’.
      c. ACI 224.1R-07, ‘*Causes, Evaluation, and Repair of Cracks in Concrete Structures*’.
      d. ACI 224.2R-92(R2004): ‘*Cracking of Concrete Members in Direct Tension*’.
      e. ACI 224.3R-95(R2013), ‘*Joints in Concrete Construction*’.
      f. ACI 224.4R-13, *'Guide to Design Detailing to Mitigate Cracking'*.
      g. ACI 302.1R-04: ‘*Guide for Concrete Floor and Slab Construction'*.
      h. ACI 302.2R-06, ‘*Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials’*.

i. ACI 304R-00, *'Guide for Measuring, Mixing, Transporting and Placing Concrete*'.
j. ACI 304R.6R-09, *'Guide for the Measure of Volumetric-Measuring & Continuous-Mixing Concrete Equipment*'.
k. ACI 305R-10, '*Guide to Hot Weather Concreting'*.
l. ACI 306R-10, *'Guide to Cold Weather Concreting'*.
m. ACI 309.1R-08, '*Report on Behavior of Fresh Concrete During Vibration'.*
n. ACI 311.4R-05, *'Guide for Concrete Inspection'*.
o. ACI 347-04, *'Guide to Formwork for Concrete'*.
p. Certifications:
1) ACI CP-1(13), *'Technical Workbook for ACI Certification of Concrete Field Testing Technician-Grade 1*'.
2) ACI CP-10(10), *'Craftsman Workbook for ACI Certification of Concrete Flatwork Technician/Finisher'*.
3) ACI CP-19(13), *'Technical Workbook for ACI Certification of Concrete Strength Testing Technician'*.

2. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).

B. Definitions (Following are specifically referenced for testing):
1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
2. Approved: To authorize, endorse, validate, confirm, or agree to.
3. Cementitious Materials: Portland cement alone or in combination with one or more of following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.
4. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
5. Floor Flatness (FF): Rate of change in elevation of floor over a 12 inches (305 mm) section.
6. Floor Levelness (FL): Measures difference in elevation between two points which are 10 feet (3.05 m) apart.
7. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards:
a. Inspection: Not required by code provisions but may be required by Contract Documents.
b. Special Inspection: Required by code provisions and by Contract Documents.
c. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
d. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
8. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operation, including installation, erection, application, and similar operations.
9. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. They are not samples. Approved mockups establish standard by which the Work will be judged.
10. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
11. Owner's Representative: Owner's Designated Representative (Project Manager or Facilities Manager) who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.

12. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
13. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
14. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
15. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
16. Service Provider: Agency or firm qualified to perform required tests and inspections.
17. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
18. Special Inspection: See Inspection.
19. Special Inspector: Certified individual or firm that implements special inspection program for project.
20. Special Test: See Test.
21. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship.
    a. Test: Not required by code provisions but may be required by Contract Documents.
    b. Special Test: Required by code provisions and by Contract Documents.
22. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
23. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
24. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.

C. Reference Standards:
1. American Association of State and Highway Transportation Officials:
    a. AASHTO M 213-01 (2010), ‘Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)’.
    b. AASHTO T 318-02(2011), ‘Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying’.
2. American Concrete Institute:
    a. ACI 117-10: ‘Specifications for Tolerances for Concrete Construction and Materials and Commentary'.
    b. ACI 117M-10: ‘Specifications for Tolerances for Concrete Construction and Materials and Commentary (Metric)’.
    c. ACI 117-10: ‘Specifications for Tolerances for Concrete Construction and Materials and Commentary'.
    d. ACI 211.1-91(R2009), 'Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete'.
    e. ACI 301-10, ‘Specification for Structural Concrete for Buildings'.
    f. ACI 301M-10, ‘Specification for Structural Concrete (Metric)'.
    g. ACI 305.1-06, ‘Specification for Hot Weather Concreting’.
    h. ACI 306.1-90 (Reapproved R2002), ‘Standard Specification for Cold Weather Concreting’.
    i. ACI 308.1-11, 'Standard Specification for Curing Concrete'.
    j. ACI 308.1M-11, 'Standard Specification for Curing Concrete'.
    k. ACI 318-11, ‘Building Code Requirements for Structural Concrete and Commentary'.
3. ASTM International:
    a. ASTM A615/A615M-13, 'Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement'.
    b. ASTM A706/A706M-13, ‘Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement’.
    c. ASTM C31/C31M-12, ‘Standard Practice for Making and Curing Concrete Test Specimens in the Field'.
    d. ASTM C33/C33M-13, ‘Standard Specification for Concrete Aggregates'.
    e. ASTM C39/C39M-12a, ‘Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens'.

f. ASTM C42/C42M-13, ‘Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete'.
g. ASTM C94/C94M-13b, 'Standard Specification for Ready-Mixed Concrete'.
h. ASTM C138/C138M-13a, 'Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete'.
i. ASTM C140/C140M-13a, ‘Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units'.
j. ASTM C143/C143M-12, 'Standard Test Method for Slump of Hydraulic-Cement Concrete'.
k. ASTM C150/C150M-12, 'Standard Specification for Portland Cement'.
l. ASTM C171-07, ‘Standard Specification for Sheet Materials for Curing Concrete'.
m. ASTM C172/C172M-10, ‘Standard Practice for Sampling Freshly Mixed Concrete'.
n. ASTM C173/C173M-12, ‘Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method'.
o. ASTM C192/C192M-13a, ’Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory'.
p. ASTM C231/C231M-10, ‘Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method'.
q. ASTM C260/C260M-10a, ‘Standard Specification for Air-Entraining Admixtures for Concrete'.
r. ASTM C330/C330M-13, 'Standard Specification for Lightweight Aggregates for Structural Concrete'.
s. ASTM C494/C494M-13, 'Standard Specification for Chemical Admixtures for Concrete.
t. ASTM C496/C496M-11, ‘Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens’.
u. ASTM C567/C567M-11, ‘Standard Test Method for Determining Density of Structural Lightweight Concrete'.
v. ASTM C595/C595M-13, ‘Standard Specification for Blended Hydraulic Cements'.
w. ASTM C597-09, ‘Standard Test Method for Pulse Velocity Through Concrete'.
x. ASTM C618-12a, 'Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete'.
y. ASTM C803/C803M-03(2010), ‘Standard Test Method for Penetration Resistance of Hardened Concrete'.
z. ASTM C805/C805M-13a, ‘Standard Test Method for Rebound Number of Hardened Concrete'.
aa. ASTM C989/C989M-12a, ‘Standard Specification for Slag Cement for use in Concrete and Mortars'.
bb. ASTM C1077-13b, 'Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation'.
cc. ASTM C1157/C1157M-11, ‘Standard Performance Specification for Hydraulic Cement'.
dd. ASTM C1688/C1688M-13, ‘Standard Test Method for Density and Void Content of Freshly Mixed Pervious Concrete’.
ee. ASTM D1751-04(2013), 'Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)'.
ff. ASTM D3666-13, ‘Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials'.
gg. ASTM E329-13b: ‘Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
hh. ASTM E543-13, ‘Standard Specification for Agencies Performing Nondestructive Testing'.
ii. ASTM E1155-96(2008), 'Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers’.
jj. ASTM E1212-12, ‘Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.
kk. ASTM F710-11, ‘Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
ll. ASTM F2170-11, ‘Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.

4. Corps of Engineers:
   a. CRD-C 508 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction.

5. International Code Council (IBC):
    a. IBC Chapter 17, ‘Structural Tests and Special Inspections’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
1. Participate in pre-installation conference as specified in Section 01 3100 and held jointly with following sections:
    a. Section 03 3053: 'Miscellaneous Exterior Cast-In-Place Concrete'.
2. Schedule pre-installation conference prior to placing of footings, installation of foundation forms and reinforcing steel, and installation of anchors, dowels, inserts, and block outs in foundation walls and slabs:
3. In addition to agenda items specified in Section 01 3100, review following:
    a. Installation scheduling, coordination, placement of concrete, and placement of items installed in and under floor slab.
    b. Review requirements for preparation of subgrade.
    c. Review aggregate base requirements.
    d. Review formwork requirements.
    e. Review approved mix design requirements and use of admixtures.
    f. Review reinforcing steel submittals.
    g. Review placement, finishing, and curing of concrete including cold and hot weather requirements.
    h. Review jointing requirements and joint layout.
    i. Review concrete slab tolerances and corrective measures if tolerances not met.
    j. Review safety issues.
    k. Supplier regarding mix designs and batching procedures and with pumping subcontractor if mix is pumped.
        1) Flat work subcontractor (placing and finishing), pumper subcontractor, superintendant are to be at Pre-Installation Conference to discuss concrete mix design, placing of concrete, finishing of concrete and curing of concrete.
        2) Review Special Procedure Submittal.
    l. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
        1) Review frequency of testing and inspections.

B. Scheduling:
1. Notify Testing Agency and Architect twenty four (24) hours minimum before placing concrete.

1.4 SUBMITTALS

A. Action Submittals:
1. Shop Drawings:
    a. Show dimensioned locations of anchor bolts for hold-down anchors and columns.
    b. Show reinforcement and all necessary bending diagrams and reinforcing steel list, and construction joint locations.
    c. Provide bar schedules and bending details.
    d. Reinforced concrete walls shall be shown in scale elevation (scale at least one quarter inch to one foot). Details shall be in accordance with ACI rules.
    e. Show all formwork for concrete surfaces which are to remain exposed in the finished work.

B. Informational Submittals:
1. Certificates:
    a. Installers:
        1) Certification for National Ready Mixed Concrete Association (NRMCA).
        2) Certification for ACI-certified Flatwork Finishers and Technicians.
2. Design Data:
    a. Mix Design:

1) Furnish proposed mix design to Architect for review prior to commencement of Work.
   a) Include density (unit weight) and void content determined per ASTM C1688/C1688M for fresh mixed properties and per ASTM C140/C140M for hardened concrete properties.
   b) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use.

b. Ready-Mix Supplier:
   1) Require mix plant to furnish delivery ticket for each batch of concrete. Keep delivery tickets at job-site for use of Owner or his representatives. Tickets shall show following:
      a) Name of ready-mix batch plant.
      b) Serial number of ticket.
      c) Date and truck number.
      d) Name of Contractor.
      e) Name and location of Project.
      f) Specific class or designation of concrete conforming to that used in Contract Documents.
      g) Amount of concrete.
      h) Amount and type of cement.
      i) Total water content allowed by mix design.
      j) Amount of water added at plant.
      k) Sizes and weights of sand and aggregate.
      l) Time loaded.
      m) Type, name, manufacturer, and amount of admixtures used.
      n) Design Data.
   2) Provide certificates with supporting testing reports verifying compliance with Contract Document requirements and that materials provided are from single source for following:
      a) Cement.
      b) Aggregate.
      c) Fly Ash.

3. Source Quality Control Submittals:
   a. Concrete mix design: Submit mix designs to meet following requirements:
      1) Proportions:
         a) Mix Type D (also to be used for exterior concrete subject to freeze thaw conditions and de-icers):
            (1) 4500 psi (31.03 MPa) minimum at twenty eight (28) days.
            (2) Water / Cement Ratio: 0.45 maximum by weight.
            (3) Air entrainment: Six (6) percent plus or minus one (1) percent.
         b) Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for exterior concrete and foundation walls exposed to freeze thaw conditions or de-icers.
         c) Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.
      2) Slump:
         a) 4 inch (100 mm) slump maximum before addition of high range water reducer.
         b) 8 inch (200 mm) slump maximum with use of high range water reducer.
         c) Slump not required for Mix Type F.
      3) Admixtures:
         a) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use. Do not use any admixture without Architect's written approval.
         b) Mineral: An amount of specified Class F (or Class C where Class F is not available) fly ash not to exceed twenty (20) percent of weight of cement may be substituted for cement. If substituted, consider fly ash with cement in determining amount of water necessary to provide specified water / cement ratio.
         c) Chemical: Specified accelerator or retarder may be used if necessary to meet environmental conditions.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:

a. Record Documentation:
    1) Pour Reports:
        a) Provide report that records following information:
        b) Date and time of start of pour, Date and time of end of pour, and Date and time of end of finishing procedures.
        c) Temperature at start of pour, Temperature at end of Pour, and Maximum temperature during performance of finishing procedures.
        d) Wind speed at start of pour, Wind speed at end of pour, and Maximum wind speed during performance of finishing procedures.
        e) Humidity at start of pour, Humidity at end of pour, and High and low humidity during performance of finishing procedures.
        f) Cloud cover at start of pour, Cloud cover at end of pour, and High and low cloud cover during performance of finishing procedures.
        g) Screeding method and equipment used.
        h) Saw cut method and equipment used.
    2) Testing and Inspection Reports:
        a) Testing Agency Testing and Inspecting Reports of concrete.

1.5 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
    1. Installers and Installation Supervisor:
        a. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
    2. Ready-Mix Supplier:
        a. Comply with ASTM C94/C94M requirements and be certified according to NRMCA's 'Certification of Ready Mixed Concrete Production Facilities'.
    3. Testing Agencies:
        a. Independent agency qualified according to ASTM C1077 and ASTM E329.
            1) Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technicians, Grade I according to ACI CP-1 or equivalent certification program.
            2) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be ACI-certified Concrete Laboratory Testing Technician - Grade II.

B. Testing and Inspection:
    1. Owner will provide Testing and Inspection on concrete:
        a. See Section 01 1200: ‘Multiple Contract Summary’.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
    1. Expansion Filler Material:
        a. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage And Handling Requirements:
    1. Expansion Filler Material:
        a. Store materials in a clean, dry area in accordance with manufacturer's instructions.
        b. Protect materials during handling and application to prevent damage.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
a. BASF Admixtures, Cleveland, OH www.basf-admixtures.com.
b. Bonsal American, Charlotte, NC www.bonsal.com.
c. Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
d. Euclid Chemical Company, Cleveland, OH www.euclidchemical.com.
e. Fritz-Pak Concrete Admixtures, Dallas, TX www.fritzpak.com.
f. Grace Construction Products, Cambridge, MA www.graceconstruction.com and Grace Canada Inc, Ajax, ON (905) 683-8561.
g. L & M Construction Chemicals, Omaha, NE www.lmcc.com.
h. Larsen Weldcrete by Larsen Products Corp, Rockville, MD www.larsenproducts.com.
i. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com and Sika Canada, Pointe Claire, QC www.sika.ca.
j. Sonneborn / BASF Building Systems, Shakopee, MN www.chemrex.com.
k. Unitex, Kansas City, MO www.unitex-chemicals.com.
l. U S Mix Products Co, Denver, CO www.usspec.com.
m. W R Meadows, Hampshire, IL www.wrmeadows.com.

B. Performance:
1. Design Criteria: Conform to requirements of ASTM C94/C94M unless specified otherwise:
a. Floor Slab for interior concrete slabs:
1) Class 1 Floor:
a) Anticipated type of traffic: exposed surface – foot traffic.
b) Special considerations: Uniform finish, nonslip aggregated in specific areas, curing.
c) Final finish: Normal steel-troweled finish, nonslip finish where required.
2. Capacities:
a. For testing purposes, following concrete strengths are required:
1) At 7 days: 60 percent minimum of 28 day strengths.
2) At 28 days: 100 percent minimum of 28 day strengths.
a) Mix Type D: 4500 psi (31 MPa).

C. Materials:
1. Table One:

Portland Cement / Blended Hydraulic Cement Equivalencies		
ASTM C150/C150M (Low Alkali)	ASTM C595/C595M	ASTM C1157/C1157M
Type I	IP	GU
Type II	IP (MS)	MS
Type III		HE
Type V		HS

2. Hydraulic Cement: Meet requirements of ASTM C150/C150M, Type <**Insert Type**>.
a. Meet requirements of ASTM C595/C595M, Type <**Insert Type**>.
b. Meet requirements of ASTM C1157/C1157M, Type <**Insert Type**>.
3. Aggregates:
a. Coarse:
1) Meet requirements of ASTM C33/C33M or nonconforming aggregate that by test or actual service produces concrete of required strength and conforms to local governing codes.
2) Aggregate shall be uniformly graded by weight as follows:

a) Table Two: Flat Work, Size No. 67.

Sieve	Percent Passing	Sieve	Percent Passing

One Inch	100	25 mm	100
3/4 Inch	90 - 100	19 mm	90 - 100
3/8 Inch	20 - 55	9 mm	20 - 55
No. 4	0 - 10	4.75 mm	0 - 10
No. 8	0 - 5	2.36 mm	0 - 5

b) Table Three: All Other, Size No. 57.

Sieve	Percent Passing	Sieve	Percent Passing
1-1/2 Inch	100	38 mm	100
One Inch	95 - 100	25 mm	95 - 100
1/2 Inch	25 - 60	12 nm	25 - 60
No. 4	0 - 10	4.75 mm	0 - 10
No. 8	0 - 5	2.36 mm	0 - 5

b. Fine:
1) Meet requirements of ASTM C33/C33M.
2) Aggregate shall be uniformly graded by weight as follows:

a) Table Four:

Sieve	Percent Passing	Sieve	Percent Passing
3/8 Inch	100	9 mm	100
No. 4	95 - 100	4.75 mm	95 - 100
No. 8	80 - 100	2.36 mm	80 - 100
No. 16	50 - 85	1.18 mm	50 - 85
No. 30	25 - 60	0.60 mm	25 - 60
No. 50	10 - 30	0.30 mm	10 - 30
No. 100	2 - 10	0.15 mm	2 - 10

4. Water: Clear, apparently clean, and potable.
5. Admixtures And Miscellaneous:
a. Mineral:
1) Fly Ash: Meet requirements of ASTM C618, Class F (or Class C where Class F is not available) and with loss on ignition (LOI) of three (3) percent maximum.
b. Chemical:
1) No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
2) Air Entraining Admixture:
a) Meet requirements of ASTM C260/C260M.
b) Type Two Acceptable Products:
(1) MB-VR, MB-AE or Micro Air by BASF.
(2) Air Mix 200 Series or AEA-92 Series by Euclid.
(3) Air Plus or Super Air Plus by Fritz-Pak.
(4) Sika Air by Sika.
(5) Daravair or Darex Series AEA by W R Grace.
(6) Equal as approved by Architect before use. See Section 01 6200.
3) Water Reducing Admixture:
a) Meet requirements of ASTM C494/C494M, Type A and containing not more than 0.05 percent chloride ions.
b) Type Two Acceptable Products:
(1) Pozzolith Series by BASF.
(2) Eucon WR 75 or Eucon 91 by Euclid.
(3) FR-2 or FR-3 by Fritz-Pak.
(4) Plastocrete 160 by Sika.
(5) Daracem, WRDA, or MIRA Series by W R Grace.
(6) Equal as approved by Architect before use. See Section 01 6200.
4) Water Reducing, Retarding Admixture:
a) Meet requirements of ASTM C494/C494M, Type D and contain not more than 0.05 percent chloride ions.
b) Type Two Acceptable Products:

(1) Pozzolith Series by BASF.
(2) Eucon Retarder 75 by Euclid.
(3) FR-1 or Modified FR-1 by Fritz-Pak.
(4) Plastiment by Sika.
(5) Daratard Series or Recover by W R Grace.
(6) Equal as approved by Architect before use. See Section 01 6200.

5) High Range Water Reducing Admixture (Superplasticizer):
   a) Meet requirements of ASTM C494/C494M, Type F or G and containing not more than 0.05 percent chloride ions.
   b) Type Two Acceptable Products:
      (1) Rheobuild 1000 or Glenium Series by BASF.
      (2) Eucon 37 or Eucon 537 by Euclid.
      (3) Supercizer 1 through 7 by Fritz-Pak.
      (4) Sikament 300 by Sika.
      (5) Daracem or ADVA Series by W R Grace.
      (6) Equal as approved by Architect before use. See Section 01 6200.
6) Non-Chloride, Non-Corrosive Accelerating Admixture:
   a) Meet requirements of ASTM C494/C494M, Type C or E and containing not more than 0.05 percent chloride ions.
   b) Type Two Acceptable Products:
      (1) Accelguard 80 by Euclid.
      (2) Pozzolith NC 534 or 122HE or Pozzutec 20+.
      (3) Daraset, Polarset or Lubricon by W R Grace.
      (4) Equal as approved by Architect before use. See Section 01 6200.
7) Corrosion Inhibiting Admixture:
   a) Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
   b) Type Two Acceptable Products:
      (1) Eucon CIA by Euclid.
      (2) DCI or DCI-S by W R Grace.
      (3) Equal as approved by Architect before use. See Section 01 6200.
8) Alkali-Silica Reactivity Inhibiting Admixture:
   a) Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
   b) Type Two Acceptable Products:
      (1) Eucon Integral ARC by Euclid.
      (2) RASIR by W R Grace.
      (3) Equal as approved by Architect before use. See Section 01 6200.
9) Viscosity Modifying Admixture (VMA):
   a) Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer’s recommendation.
   b) Type Two Acceptable Products:
      (1) Visctrol by Euclid.
      (2) VMAR3 by W R Grace.
      (3) Equal as approved by Architect before use. See Section 01 6200.
10) Shrinkage Reducing Admixture (SRA):
   a) Liquid admixture specifically designed to reduce drying shrinkage and potential for cracking.
   b) Type Two Acceptable Products:
      (1) Eucon SRA by Euclid.
      (2) Eclipse 4500 (exterior concrete) by W R Grace.
      (3) Eclipse Floor 200 (interior concrete) by W R Grace.
      (4) Equal as approved by Architect before use. See Section 01 6200.

2.2 ACCESSORIES

A. Bonding Agents:
   1. Type Two Acceptable Products:
      a. Acrylic Additive by Bonsal American.
      b. Day Chem Ad Bond (J-40) by Dayton Superior.
      c. Flex-Con by Euclid Chemical Co.
      d. Larsen Weldcrete by Larsen Products Corp.
      e. Everbond by L & M Construction Chemicals.
      f. Acryl Set by BASF.
      g. Sonocrete by Sonneborn.
      h. U S Spec Multicoat by U S Mix Products.
      i. Intralok by W R Meadows.
      j. Equal as approved by Architect before use. See Section 01 6200.

B. Evaporation Retardant:
   1. Type Two Acceptable Products:
      a. Confilm by BASF.
      b. Sure Film J-74 by Dayton Superior.
      c. Eucobar By Euclid Chemical Co.
      d. E-Con by L & M Construction Chemicals.
      e. Pro Film by Unitex.
      f. U S Spec Monofilm ER by U S Mix Products.
      g. Equal as approved by Architect before use. See Section 01 6200.

C. Expansion Filler Material:
   1. Expansion Filler Material:
      a. Design Criteria:
         1) Resilient, flexible, non-extruding, expansion-contraction joint filler meeting requirements of ASTM D1751 and AASHTO M-213.
         2) 1/2 inch (12.7 mm) thick.
         3) Resilience:
            a) When compressed to half of original thickness, recover to minimum of 70 percent of original thickness.
      b. Type Two Acceptable Products:
         1) Fiber Expansion Joint by W R Meadows, Hampshire, IL www.wrmeadows.com.
         2) Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 PREPARATION

A. Concrete Mixing:
   1. General:
      a. All concrete shall be machine mixed.
      b. Water gauge shall be provided to deliver exact predetermined amount of water for each batch.
      c. reliable system must be employed to insure that no less than predetermined amount of cement goes into each batch.
      d. Re-tempering partly set concrete will not be permitted.
   2. Transit Mix:
      a. Transit mix concrete may be used provided it conforms to Specifications and tests herein described and ASTM C94/C94M.
      b. Central plant producing concrete and equipment transporting it are suitable for production and transportation of controlled concrete and plant is currently approved by local state DOT.
      c. Maximum elapsed time between time of introduction of water and placing shall be one (1) hour.

d. Minimum time of mixing shall be one (1) minute per cubic yard after all material, including water, has been placed in drum, and drum shall be reversed for an additional two (2) minutes.
e. Mixing water shall be added only in presence of Inspecting Engineer or inspector employed by Testing Agency.
f. Trucks shall not be overloaded in excess of rated capacity as recommended by manufacturer.

B. Surface Preparation:
1. Inserts, bolts, boxes, templates, pipes, conduits, and other accessories required by Divisions 22, 23, and 26 shall be installed and inspected before placing concrete.
2. Install inserts, bolts, boxes, templates, pipes, conduits, and other accessories furnished under other Sections to be installed as part of work of this Section.
a. Tie anchor bolts for hold-down anchors and columns securely to reinforcing steel.

C. Removal:
1. Remove water and debris from space to be placed.

3.2 INSTALLATION

A. Special Techniques:
1. Cold Weather Concreting Procedures:
a. General Requirements:
1) Materials and equipment required for heating and protection of concrete shall be approved and available at Project site before beginning cold weather concreting.
a) Heating devices used to maintain specified temperatures shall have baffle plate above, of sufficient size, and sand bed below, in order to distribute heat.
b) Heating devices shall be so operated that temperature of air immediately below slab forms shall not exceed 100 deg F (37.8 deg C). Provide sufficient and suitable thermometers to verify compliance.
2) Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including sub-grade materials, shall be 35 deg F (2 deg C) minimum at time of concrete placement.
3) Thaw sub-grade 6 inches (150 mm) deep minimum before beginning concrete placement. If necessary, re-compact thawed material.
4) Use no frozen materials or materials containing ice.
5) No salt or other chemical may be used for such protection.
6) Only specified non-corrosive non-chloride accelerator shall be used. Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.
b. Requirements When Average twenty four (24) Hour Temperature, midnight to midnight, Is Below 40 deg F (4 deg C):
1) Temperature of concrete as placed and maintained shall be 55 deg F (13 deg C) minimum and 75 deg F (27 deg C) maximum.
2) Heat concrete for seventy two (72) hours minimum after placing if regular cement is used; for 48 hours if high early strength cement is used; or longer if determined necessary by Architect.
a) During this period, maintain concrete surface temperature between 55 and 75 deg F (13 and 27 deg C).
3) Vent flue gases from combustion heating units to outside of enclosure to prevent carbonation of concrete surface.
4) Prevent concrete from drying during heating period. Maintain housing, insulation, covering, and other protection twenty four (24) hours after heat is discontinued.
5) After heating period, if temperature falls below 32 deg F (0 deg C), protect concrete from freezing until strength of 2000 psi (13.79 MPa) minimum is achieved.
a) Protect flatwork exposed to melting snow or rain during day and freezing during night from freezing until strength of 3500 psi (24.13 MPa) minimum is achieved.
c. Requirements When Average twenty four (24) Hour Temperature, midnight to midnight, Is Above 40 deg F (4 deg C), but when temperature falls below 32 deg F (0 deg C):

1) Protect concrete from freezing for seventy two (72) hours after placing, or until strength of 2000 psi (13.79 MPa) is achieved, whichever is longer.
2) Protect flatwork exposed to melting snow or rain during day and freezing during night from freezing until strength of 3500 psi (24.13 MPa) minimum is achieved.

d. Protect soil supporting concrete footings from freezing under any circumstances.

2. Hot Weather Concreting Procedures:
   a. Maximum concrete temperature allowed is 90 deg F (32 deg C) in hot weather.
   b. Cool aggregate and subgrades by sprinkling.
   c. Avoid cement over 140 deg F (60 deg C).
   d. Use cold mixing water or ice.
   e. Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.

B. Tolerances:
1. Tolerances shall conform to requirements of ACI 117 or CSA A23.1, except where specified differently:
   a. Floor test surfaces shall be measured and reported within seventy two (72) hours after completion of slab concrete finishing operations and before removal of any supporting shores to eliminate any curling effect F-numbers.
2. Local Flatness / Levelness of Interior Slabs (Carpet and Tile Areas):
   a. Specified Overall Value of F_F45 / F_L35 and Minimum Local Value of F_F30 / F_L20 when tested in accordance with ASTM E1155.
   b. Table Five: Maximum Variation Tolerances.

Thickness, standard	plus 3/8 inch, minus 1/4 inch	plus 9.5 mm, minus 3 mm
Thickness, footings	minus 0 inch	minus 0 mm
Plan, 0 - 20 feet	1/2 inch	12.7 mm
Plan, 40 feet or greater	3/4 inch	19 mm
Plan, footings	plus 1/2 inch	plus 12.7 mm
Eccentricity, footings	2 inch max standard, 1/2 inch at masonry	50 mm max standard, 12.7 mm at masonry
Openings, size	minus 1/4 inch, plus One inch	minus 6 mm, plus 25.4 mm
Openings, location	plus / minus 1/2 inch at center	plus / minus 12.7 mm at center
Plumb	1/2 inch max	12.7 mm max
Consecutive Steps, treads	1/4 inch	6 mm
Consecutive Steps, risers	1/8 inch	3 mm
Flight of Stairs, treads	1/4 inch in total run	6 mm in total run
Flight of Stairs, risers	1/8 inch in total height	3 mm in total height

   c. Remedy For Out-of-Tolerance Building Slabs (Carpet Areas):
      1) Sections of slabs to be covered by carpet, which do not meet specified tolerances but are within ten (10) percent of specified tolerances, may be corrected by grinding or filling, at Owner's option.
      2) Remove and replace sections of slabs measuring outside specified correctable tolerances.
3. Local Flatness / Levelness of Interior Slabs (Wood Floor Areas):
   a. Specified Overall Value of F_F50 / F_L33 and Minimum Local Value of F_F25 / F_L17 when tested in accordance with ASTM E1155.
   b. Remedy For Out-of-Tolerance Building Slabs (Wood Floor Areas):
      1) Sections of slabs to be covered by wood flooring, which do not meet specified tolerances but are within ten (10) percent of specified tolerances, may be corrected by grinding or filling, at Owner's option.
      2) Remove and replace sections of slabs measuring outside specified correctable tolerances.

C. Placing:
1. General:
   a. Structural
2. General:
   a. Place as soon after mixing as possible.

b. Deposit as nearly as possible in final position.
c. No concrete shall be deposited in water.
d. Placing of concrete shall be continuous until panel or section is complete.

e. Compact concrete in forms by vibrating and other means where required.
1) Thoroughly consolidate concrete around reinforcing bars (Consolidation not required in concrete around reinforcing bars with Mix Type F).
2) Use and type of vibrators shall conform to ACI 309.
f. Consolidate concrete thoroughly.
g. Do not embed aluminum in concrete.
h. Do not use contaminated, deteriorated, or re-tempered concrete.
i. Avoid accumulation of hardened concrete.

3. Footings:
a. Bear 12 inches (300 mm) minimum into undisturbed earth or on mechanically compacted engineered fill. Step footings at ratio of 1-1/2 horizontal to One vertical unless detailed otherwise. Exterior wall footing shall bear <**Insert Dimension**> minimum below finish grades.
b. Level top of finish footing and leave rough.
c. Where joints are required, bulkhead, key horizontally, and dowel with two No. 5 reinforcing bars, 48 inches (1 200 mm) long.
4. Foundations And Walls: Leave steel projecting where required for floor tie.
5. Exterior Slabs:
a. Dusting with cement not permitted.
b. For continuous placing and where shown on Drawings, saw cut one inch deep control joints before shrinkage occurs (2 inches at 6 inch slabs) (50 mm at 150 mm slabs).
6. Equipment Bases: Coordinate with appropriate Sections for locations and dimensions.
7. Joints:
a. Construction Joints: Locate where shown on Drawings to least impair strength of completed structure. Construction joints in foundation walls shall not occur within 6 feet (1.80 meters) of corner and be keyed.
8. Bonding Fresh And Hardened Concrete:
a. Re-tighten forms.
b. Roughen surfaces.
c. Clean off foreign matter and laitance.
d. Wet but do not saturate.
e. Slush with neat cement grout or apply bonding agent.
f. Proceed with placing new concrete.
9. Anchor Bolts:
a. Place anchor bolts not tied to reinforcing steel immediately following leveling of concrete. Reconsolidate concrete around bolt immediately after placing bolt.
b. Do not disturb bolts during finishing process.

D. Finishing:
1. Rubbed Finish, Exposed Vertical Surfaces:
a. Smooth Rubbed Finish shall be as specified in Section 03 3053.
2. Steel Trowel Finishes, Interior Flatwork:
a. Float and steel trowel interior slabs after concrete has set enough to avoid bringing water and fines to surface.
b. If power troweling is used, get approval of finish from Architect.
3. Broom Finishes, Exterior Flatwork Not Specified in Section 03 3053:
a. Broom finish exterior slabs.
b. Round edges including edges formed by expansion joints.
c. Remove edger marks.

E. Curing:
1. All Other Concrete Flatwork And Curbs: Membrane cure as specified in Section 03 3923.

3.3 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
   1. Concrete:
      a. Testing Agency shall provide testing and inspection for concrete as per ASTM C1077.
      b. Testing Agency will sample and test for quality control during placement of concrete as directed by Architect.
      c. Testing and inspections, if performed, will include following:
         1) Periodic inspection verifying use of required design mix.
         2) Inspection at time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine temperature of concrete.
         3) Inspection of concrete and shotcrete placement for proper application techniques.
         4) Periodic inspection for maintenance of specified curing temperature and techniques.
         5) Periodic inspect of formwork for shape, location and dimensions of concrete member being formed:
            a) Certified Inspector shall inspect forms for general location, configuration, camber, shoring, sealing of form joints, correct forming material, concrete accessories, and form tie locations.
         6) Concrete moisture and alkalinity testing. See Section 09 0503 Flooring Substrate Preparation.
      d. Testing Agency will sample and test during placement of concrete as directed by Architect and may include following:
         1) Sampling Fresh Concrete: ASTM C172/C172M, except modified for slump to comply with ASTM C94/C94M:
            a) Slump: ASTM C143/C143M, test each time set of compressive specimens are made.
            b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight concrete each time set of compression test specimens are made.
            c) Concrete Temperature: Test each time set of compressive specimens are made.
            d) Unit Weight: ASTM C567/C567M, Test each time set of compressive specimens are made.
      e. Compression Test Specimen: ASTM C31/C31M; one (1) set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
      f. Compressive Strength Tests: ASTM C39/C39M: Provide three (1) random sets for site cast concrete (sidewalks, curbs, gutters, etc). Testing of concrete for Building is not required and will be performed at discretion of Architect:
         1) If sets are taken, one (1) specimen tested at seven (7) days, two (2) specimens tested at twenty eight (28) days, and one (1) specimen retained in reserve for later testing if required.
         2) If strength of field-cured cylinders is less than eighty five (85) percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
         3) Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi (3.45 MPa).

3.4 PROTECTION

A. Protect concrete that has not received its initial set from precipitation to avoid excess water in mix and unsatisfactory surface finish.

B. Do not allow materials resulting from construction activities, which will affect concrete or application of finish floor systems adversely, to come in contact with interior concrete slabs.

C. Protect interior concrete floors from stains, paint, mortar and other construction activities.

END OF SECTION

SECTION 03 3923

MEMBRANE CONCRETE CURING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of membrane concrete curing as described in Contract Documents.

B. Related Requirements:
   1. Section 03 3053: 'Miscellaneous Cast-In-Place Concrete'.
   2. Section 03 3111: 'Normal-Weight Structural Concrete'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM C309-11, 'Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's product data.

B. Informational Submittals:
   1. Manufacturer Instructions:
      a. Printed installation instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Exterior:
   1. Low VOC (less than 350 grams per liter), water-borne, membrane forming curing compound meeting requirements of ASTM C309, Type 2.
   2. Horizontal Miscellaneous Cast-In-Place Concrete:
      a. Class Two Quality Standard. See Section 01 6200 for definition of Classes.
         1) Vocomp 20 Cure and Seal by W. R. Meadows.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:
   1. Protect surfaces that will be receiving products or systems incompatible with curing compounds.
   2. Where such surfaces do receive curing compound, remove to extent required by installer of products and systems to be subsequently installed and at no additional cost to Owner.

END OF SECTION

DIVISION 05: METALS

05 5000 METAL FABRICATIONS

05 5215 STAINLESS STEEL HANDRAILS

END OF TABLE OF CONTENTS

SECTION 05 5215

STAINLESS STEEL HANDRAILS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install stainless steel pipe handrails as described in Contract Documents.

B. Products Furnished But Not Installed Under This Section:
   1. Anchoring sleeves in concrete for stainless steel pipe handrails.

C. Related Requirements:
   1. Section 03 3111: 'Cast-In-Place Structural Concrete' for installation of anchoring sleeves cast into concrete.
   2. Section 05 0523: 'Metal Fastening' for quality of welding.

1.2 REFERENCES

A. Definitions:
   1. Non-shrink Grout: Structural grout used for filling voids between elements that is formulated with cement, fine aggregates and admixtures. Admixtures are used to provide expansive properties of the material during curing. This expansion counteracts the natural tendency of cement grouts to shrink during curing.
   2. Peened: Nonslip textured gripping surface that is much easier to hold on to.
   3. Stainless Steel Alloys:
      a. Type 304 (UNS S30400): Austenitic stainless steel with non-magnetic properties in annealed condition that provide good corrosion resistance to both chemical and atmospheric exposures, with high resistance to oxidations. Most common and widely used stainless steel.

B. Reference Standards:
   1. ASTM International:
      a. ASTM C1107/C1107M-17, ‘Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Show fabrication and installation of handrails and railings including floor plans, elevations, sections, details of components, and attachments to other elements of The Work.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Materials:
   1. Handrails And Railings:
      a. 1-1/2 inch (38 mm) outside diameter non-magnetic satin finish 16 gauge (0.063) (1.6002 mm) type 304 stainless tubing.

2. Pipe Sleeves: 2 inch (50 mm) diameter by 6 to 9 inch (150 to 225 mm) long non-magnetic stainless steel.

B. Fabrication:
1. Preassemble railing systems in shop to greatest extent possible to minimize field splicing and assembly.
2. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
3. Grind smooth welded joints and buff welds to same appearance as remainder of railing.
4. Form curves by bending pipe in jigs to produce uniform curvature for each configuration required. Maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
5. Return pipe ends of wall mounted handrails into wall.
6. Welded Connections:
   a. Fabricate railing system and handrail connections by welding.
   b. Weld corners and seams continuously to comply with following:
      1) Use materials and methods that minimize distortion and develop of metals.
      2) At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
      3) At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and so contours of welded surfaces match adjacent surfaces.

2.2 ACCESSORIES

A. Rail Setting Grout:
1. Commercial non-shrink grout conforming to requirements of ASTM C1107, Type B or Type C.
2. Type Two Acceptable Manufacturers:
   a. Normal Construction Grout A by Bonsal American, Charlotte, NC www.bonsal.com.
   b. Advantage 1107 Grout by Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
   c. NS Grout by Euclid Chemical Co, Cleveland, OH www.euclidchemical.com
   d. 5 Star Special Grout 110 by Five Star Products Inc, Fairfield, CT www.fivestarproducts.com.
   e. Duragrout by L&M Construction Chemicals Inc, Omaha, NE www.lmcc.com.
   f. Sonneborn / BASF Building Systems, Shakopee, MN www.chemrex.com.
   g. Tamms Grout 621 by TAMMS Industries, Mentor, OH www.tamms.com.
   h. U S Spec MP Grout by U S Mix Products Co, Denver, CO www.usspec.com.
   i. CG-86 Grout by W R Meadows, Hampshire, IL www.wrmeadows.com.
   j. Equal as approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Touch up field welds to match finished material.

END OF SECTION

DIVISION 07: THERMAL AND MOISTURE PROTECTION

07 9000 JOINT PROTECTION

07 9213 ELASTOMERIC JOINT SEALANTS

END OF TABLE OF CONTENTS

SECTION 07 9213

ELASTOMERIC JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants not specified to be furnished and installed under other Sections.
   2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.

B. Related Requirements:
   1. Removing existing sealants specified in Sections where work required.
   2. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.

1.2 REFERENCES

A. Association Publications:
   1. American Architectural Manufacturers Association (AAMA):
      a. 'Voluntary Specifications and Test Methods for Sealants'.
   2. ASM International:
      a. 'Adhesives and Sealants', Volume 3, ASM International Handbook Committee, (May 1999).
      b. Committee C24 on Building Seals and Sealants for various Specifications, Guides, Test Methods, and Practices related to sealant specifying and application.
      c. Committee E6 on Building Performance for various Specifications, Guides, Test Methods, and Practices related to sealant use with air barriers, vapor retarders, and exterior enclosure systems and materials.
   3. The Adhesive and Sealing Council, Inc. (ASC) / Sealant, Waterproofing & Restoration Institute (SWR Institute):
      a. 'Sealants: The Professional's Guide'.
      b. 'Joint Sealants, Whole Building Design Guide'.

B. Definitions:
   1. Adhere: To cause two surfaces to be held together by adhesion.
   2. Adhesive: An adhesive, as defined by The American Society for Testing and Materials (ASTM), is 'a substance capable of holding materials together by surface attachment'.
   3. Caulk: Caulks have variety of definitions but are generally recognized as materials used in applications where only minor elastomeric properties are needed.
   4. Elastomer: Rubbery material which returns to approximately its original dimensions in short time after relatively large amount of deformation.
   5. Flow: Movement of adhesive during bonding process before adhesive is set.
   6. Joint: Location at which two substrates are held together with layer of adhesive.
   7. Primer: Coating applied to surface, prior to application of an adhesive, to improve performance of the bond.
   8. Sealant. Sealants are generally used in applications where elastic properties are needed while adhesives are generally used in applications where bonding strength and rigidity are needed. With technology advancements both sealants and adhesives can be used interchangeably depending on applications performance requirements.
   9. Sealant Types and Classifications:
      a. ASTM Specifications:
         1) Type:

a) Type S: Single-component sealant.
b) Type M: Multi-component sealant.

2) Grade:
a) Grade P: Pourable or self-leveling sealant used for horizontal traffic joints.
b) Grade NS: Non-sag or gunnable sealant used for vertical and non-traffic joints.

3) Classes: Represent movement capability in percent of joint width.
a) Class 100/50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand of at least 100 percent increase and decrease of at least 50 percent of joint width as measured at time of application.
b) Class 50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 50 percent of joint width as measured at time of application.
c) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
d) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.

4) Use:
a) T (Traffic): Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.
b) NT (Non-Traffic): Sealant designed for use in joints in non-traffic areas.
c) I (Immersion): Sealant that meets bond requirements when tested by immersion (Immersion rated sealant applications require primer).
d) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.
e) G (Glass): Sealant that meets bond requirements when tested on glass specimens.
f) A (Aluminum): Sealant that meets bond requirements when tested on aluminum specimens.
g) O (Other): Sealant that meets bond requirements when tested on substrates other than standard substrates, being glass, aluminum, mortar.

b. Federal Specifications:

1) Type:
a) Type I: Self-leveling, pour grade.
(1) Compound which has sufficient flow to give smooth level surface when applied in horizontal joint at 40 deg F (4.4 deg C).
b) Type II: Non-sag, gun grade
(1) Compound which permits application in joints on vertical surfaces without sagging (slumping) at temperatures 40 deg F (4.4 deg C) and 122 deg. F (50 deg. C).
c) Type NS: Non-sag, gun grade.
(1) Non-sag shall be a compound which permits application in joints on vertical surfaces without sagging (slumping) at temperatures between -20 deg F and 122 deg. F (- 29 and 50 deg. C).

2) Class:
a) Class A: Compounds resistant to 50 percent total joint movement (includes Type I and Type II).
(1) Capable of resisting compression-extension cycling of plus and minus 25 percent of nominal half inch width.
b) Class B: Compounds resistant to 25 percent total joint movement (includes Type I and Type II).
(1) Capable of resisting compression-extension cycling of plus and minus12 1/2 percent of nominal half inch width.

10. Shelf Life: Period of time, usually beginning with date of manufacture, during which stored adhesive will remain effective or useful.
11. Silicone: Any member of family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms and which has pendant hydrocarbon groups attached to silicon atoms. Used primarily as a sealant. Offers excellent resistance to water and large variations in temperature (minus 100 deg F to + 600 deg F) (minus 73.3 deg C to + 316 deg C).

12. Stability: Ability of material to remain unchanged.
13. Storage Life: Period of time during which packaged adhesive can be stored under specified temperature conditions and remain suitable for use.
14. Substrate: Material upon surface of which an adhesive-containing substance is spread for any purpose, such as bonding or coating.
15. Surface Preparation: Physical and /or chemical preparation of substrate to render it suitable for adhesive joining. Same as substrate preparation or pre-bond preparation.
16. Toxicity: Material shall have no adverse effect on health of personnel when used for its intended purpose.

C. Reference Standards:
1. ASTM International:
   a. ASTM C639-01(2011), 'Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants'.
   b. ASTM C661-06(2011), 'Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer'.
   c. ASTM C679-03(2009), ‘Standard Test Method for Tack-Free Time of Elastomeric Sealants’.
   d. ASTM C719-13, ‘Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)’.
   e. ASTM C794-10, 'Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants'.
   f. ASTM C920-14, ‘Standard Specification for Elastomeric Joint Sealants’.
   g. ASTM C1135-00(2011), 'Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants'.
   h. ASTM C1184-13, 'Standard Specification for Structural Silicone Sealants'.
   i. ASTM C1193-13, ‘Standard Guide for Use of Joint Sealants’.
   j. ASTM C1248-08(2012), 'Standard Test Method for Staining of Porous Substrate by Joint Sealants'.
   k. ASTM C1330-02(2013), ‘Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants’.
   l. ASTM C1481-12 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
   m. ASTM D412-06(2013), ‘Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension’.
   n. ASTM D2202-00(2010), 'Standard Test Method for Slump of Sealants'.
   o. ASTM D2240-05(2010), ‘Standard Test Method for Rubber Property-Durometer Hardness’.
2. Federal Specifications:
   a. Federal Specification TT-S-001543A (CON-NBS), 'Sealing Compound: Silicone Rubber Base (for Calking, Sealing & Glazing in Buildings and Other Structures)' (9 Jun 1971).
   b. TT-S-00230C (CON-NBS), ‘Sealing compound: Elastomeric Type, Single Component (For Calking, Sealing, And Glazing In Buildings And Other Structures.’ (2 Feb 1970).
3. Government Services Administration (GSA), Commercial Item Descriptions (CID):
   a. GSA CID A-A-272A, ‘Sealing Compound: Silicone Rubber Base (For Caulking, Sealing, and Glazing in Buildings and Other Structures)’.
   b. GSA CID A-A-1556, ‘Sealing Compound Elastomeric Type, Single Component (For Caulking, Sealing, and Glazing in Buildings and Other Structures)’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
2. Ensure sealants are cured before covering with other materials.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:

a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
b. Manufacturer's literature for each Product.
c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:
1. Certificates:
a. Manufacturer's Certificate:
1) Certify products are suitable for intended use and products meet or exceed specified requirements.
2) Certificate from Manufacturer indicating date of manufacture.
2. Manufacturers' Instructions:
a. Manufacturer's installation recommendations for each Product.
b. Manufacturer's installation for completing sealant intersections when different materials are joined.
c. Manufacturer's installation for removing existing sealants and preparing joints for new sealant.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
2. Applicator Qualifications:
a. Company specializing in performing work of this section.
b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

B. Preconstruction Testing:
1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

C. Mockups:
1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
a. Incorporate accepted mockup as part of Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
1. Deliver and keep in original containers until ready for use.
2. Inspect for damage or deteriorated materials.

B. Storage and Handling Requirements:
1. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
3. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) or as per Manufacturer's written recommendations.
4. Do use sealants that have exceeded shelf life of product.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
   2. Follow Manufacturer’s temperature recommendations for installing sealants.

1.8 WARRANTY

A. Manufacturer Warranty:
   1. Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
      a. Manufacturer's standard warranty covering sealant materials.
      b. Applicator’s standard warranty covering workmanship.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Dow Corning Corp., Midland, MI www.dowcorning.com.
      b. Franklin International, Inc. Columbus, OH www.titebond.com.
      c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
      d. Laticrete International Inc., Bethany, CT www.laticrete.com.
      e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
      f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
      g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
      h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:
   1. Design Criteria:
      a. Compliance: Meet or exceed requirements of these standards:
         1) ASTM C920: Elastomeric joint sealant performance standard.
         2) ASTM C639 or ASTM D2202: Flow (sag or slump).
         3) ASTM C661 or ASTM D2240: Durometer hardness (shore A).
         4) ASTM C679 or ASTM C794: Tack free time.
         5) ASTM C719: Joint movement capability.
         6) ASTM C1135 or ASTM D412: Tensile adhesion strength.
         7) ASTM C1184: Structural silicone sealants.
         8) ASTM C1248: Staining.
         9) Federal Specification TT-S-001543A.
         10) Federal Specification TT-S-00230C.
         11) GSA CID A-A-272A.
         12) GSA CID A-A-1556.
      b. Comply with Manufacturer’s ambient condition requirements.
      c. Sealants must meet Manufacturer's shelf-life requirements.
      d. Sealants must adhere to and be compatible with specified substrates.
      e. Sealants shall be stable when exposed to UV, joint movements, and particular environment prevailing at project location.
      f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer.

Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
1) Adhesion Test:
a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
2) If Primer required, shall not stain and shall be compatible with substrates.
3) Allow primer to dry before applying sealant.

2. Sealants At Exterior Concrete:
a. Expansion Joints:
1) Design Criteria:
a) Meet following standards for Sealant:
(1) ASTM C920: Type S Grade NS, Class 50 Use A, G, M, O.
2) Weathersealing required at expansion for following areas:
a) Between entryway slabs and building foundations.
b) Between sidewalks and building foundations.
c) Within curbs and gutters.
d) Within flat drainage structures and at joints between flat drainage structures and other concrete elements.
3) Weathersealing NOT required at expansion joints for following areas:
a) Within aprons and where apron abuts building foundation and sidewalks.
b) Within mow strips and where mow strip abuts building foundation and sidewalks.
c) Within sidewalks.
4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Dow Corning:
(1) Primer: 1200 Prime Coat.
(2) Sealant: 790 Silicone Building Sealant.
b) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
(1) Primer: SS4044 Primer.
(2) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.

2.2 ACCESSORIES

A. Bond Breaker Tape:
1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.

B. Joint Backing:
1. Comply with ASTM C1330.
2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
3. Oversized 25 to 50 percent larger than joint width.

C. Joint Cleaner:
1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.

D. Masking Tape:
1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Examine substrate surfaces and joint openings are ready to receive Work.
      a. Verify each sealant is compatible for use with joint substrates.
      b. Verify joint surfaces are clean and dry.
      c. Ensure concrete surfaces are fully cured.
   2. Sealants provided shall meet Manufacturer's shelf-life requirements.
   3. Notify Architect of unsuitable conditions in writing.
      a. Do not proceed until unsatisfactory conditions are corrected.
   4. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Surface Preparation:
   1. Remove existing joint sealant materials where specified.
      a. Clean joint surfaces of residual sealant and other contaminates capable of affecting sealant bond to joint surface using manufacturer’s recommended joint preparation methods.
      b. Repair deteriorated or damaged substrates as recommended by Sealant Manufacturer to provide suitable substrate. Allow patching materials to cure.
   2. Surfaces shall be clean, dry, free of dust, oil, grease, dew, or frost. Prepare substrates in accordance with Manufacturer’s instructions:
      a. Porous surfaces: Abrasive-clean followed by blasting with oil-free compressed air.
      b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193.
      c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
   3. Field test joints in inconspicuous location.
      a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
      b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
   4. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

B. Joints:
   1. Prepare joints in accordance with ASTM C1193.
      a. Clean joint surfaces of contaminates capable of affecting sealant bond to joint surface using Manufacturer’s recommended instructions for joint preparation methods.
      b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
      c. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protection:
   1. Protect elements surrounding the Work of this section from damage or disfiguration.

3.3 APPLICATION

A. General:
   1. Apply silicone sealant in accordance with Manufacturer’s instructions.
   2. Do not use damaged or deteriorated materials.
   3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer’s instructions.
   4. Apply primer where required for sealant adhesion.
   5. Install sealants immediately after joint preparation.
   6. Do not use silicone sealant as per the following:
      a. Apply caulking/sealant at temperatures below 40 deg F (4 deg C).

b. Below-grade applications.
c. Brass and copper surfaces.
d. Materials bleeding oils, plasticizers, and solvents.
e. Structural glazing and adhesive.
f. Surfaces to be immersed in water for prolonged time.

B. Joint Backing:
1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.

C. Bond Breaker:
1. Install bond breaker where joint backing is not used or where backing is not feasible.
a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

D. Sealant:
1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
2. Fill joint opening to full and proper configuration.
3. Apply in continuous operation.
4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
5. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

E. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than 3/16 inch (5 mm) between painted or coated substrates.

3.4 TOLERANCES

A. Provide joint tolerances in accordance with Manufacturer’s printed instructions.

3.5 CLEANING

A. Remove masking tape and excess sealant.

B. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.

C. Waste Management: Dispose of products in accordance with manufacturer’s recommendation.

END OF SECTION

DIVISION 08: OPENINGS

08 4000 ENTRANCES, STOREFRONTS, AND CURTAIN WALLS

08 4113 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

END OF TABLE OF CONTENTS

SECTION 08 4113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install low energy swinging operator for ADA compliance at existing storefront opening, as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:
   1. American National Standards Institute / Builders Hardware Manufacturers Association:
      a. ANSI/BHMA A156.19-2013, ‘Power Assist & Low Energy Operated Doors'.
   2. International Code Council / American National Standards Institute:
      a. ICC / ANSI A117.1-2009, ‘Accessible and Usable Buildings and Facilities'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in MANDATORY pre-installation conference as specified in Section 06 1100.
      a. Schedule pre-installation conference one (1) week before scheduled installation of low energy swinging operators.
         1) Review installation scheduling, coordination, placement of doors.
         2) Review low-energy door operator location and requirements.
         3) Review delivery, storage, and handling requirements.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature.
         1) Low-energy door operator.
      b. Color and finish.
   2. Shop Drawings:
      a. Clearly mark components to identify their location in Project.
      b. Show locations, sizes, etc, of hardware reinforcing.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Maintenance, adjustment, and repair instructions.
      b. Warranty Documentation:
         1) Final, executed copy of Warranty.
            a) Low-energy door operator.
      c. Record Documentation:
         1) Manufacturers documentation:
            a) Manufacturer's literature or cut sheets for storefront system and for each item of hardware.
            b) Manufacturer’s literature of cut sheets for low-energy door operators.

c) Color and finish selections.
d) Parts lists.

1.5 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
   1. Manufacturer Qualifications:
      a. Provide Low-energy door operator produced by firm experienced in manufacturing systems that are similar to those indicated for this project and have record of successful in-service performance.
   2. Fabricator Qualifications:
      a. Provide Low-energy door operator fabricated by a firm experienced in producing systems that are similar to those indicated for this Project, and have record of successful in-service performance.
      b. Fabricator shall have sufficient production capacity to produce components required without causing delay in progress of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver all parts of door, together with hardware, in original, unopened packages with labels intact to Project at same time.

B. Storage And Handling Requirements:
   1. Store in clean, dry location, indoors in Manufacturer’s unopened packaging until ready for installation and in accordance with Manufacturer’s instructions.
   2. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.
   3. Protect materials and finish from damage during storage, handling and installation.

1.7 WARRANTY

A. Manufacturer Warranty:
   1. Closers:
      a. Closer Manufacturer's standard warranty, 10 years minimum.
   2. Low-Energy Door Operator:
      a. Manufacturer’s standard warranty.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Materials:
   1. Hardware:
      a. Low-Energy Swing Door Operator:
         1) Meet requirements of ICC/ANSI 117.1 and BHMA A156.19.
         2) Wall-mounted push button operation. (Wireless to connect to meetinghouse system)
         3) Solid state electronic control.
         4) Adjustable closing speed and hold-open range.
         5) Automatic and manual operating modes.
         6) Metal cover finished to match door.
         7) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
            a) Besam SW100 by Besam (subsidiary of ASSA ABLOY) US-Monroe, NC www.besam.us.

b) Horton Series 7100 Low Energy by Horton Automatics (Division of Overhead Door Corp.), Corpus Christi, TX www.hortondoors.com.
c) Record 6100 Series Low Energy Swing Door Operator by Record-USA, Monroe, NC www.record-usa.com.
d) Stanley Magic-Force by Stanley Access Technologies, Farmington, CT www.stanleyaccesstechnologies.com.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Performance Standard Installers: See Section 01 6200 for definitions of Categories. See Section 01 4301 and 'Quality Assurance' in Part 1 'General' for Installer Qualifications of this specification:
1. General Contractor responsible for Installer(s), verification of qualifications, and performance. Contact Approved Manufacturer's Representative specified in Part 2 'Products' of this specification for potential installers if desired.

3.2 EXAMINATION

A. Verification Of Conditions:
1. Verify that framed openings comply with Contract Document requirements.
2. Verify floor is level across entire width of automatic door opening.
3. Verify sill conditions are level and/or sloped away from openings as specified.
4. Verify wall framing is dry, clean, sound, and free of voids and offsets, construction debris, sharp edges or anything that will prevent a successful installation of storefront system.
5. Notify Architect and Owner in writing if framed openings are not as agreed upon.
   a. Do not install storefront entry and window frames until deficiencies in framed openings have been corrected to allow installation of standard entries and windows.
   b. Commencement of Work by installer is considered acceptance of substrate.

3.3 INSTALLATION

A. General:
1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
2. All installation shall be in accordance with manufacturer's published recommendations and in accordance with approved shop drawings.
3. Do not install damaged components. Fit frame joints tight, free of burrs and distortion. Rigidly secure non-movement joints.
4. Isolate metal surfaces in contact with incompatible metal or corrosive substrates, including wood, by applying sealer tape to prevent electrolytic action.

B. Set plumb, square, level, and in correct alignment and securely anchor to following tolerances:
1. Variation from plane: Limit to 1/8 inch (3 mm) in 12 feet (3.6 meters); 1/4 inch (6 mm) over total length.
2. Offset from Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.6 mm).
3. Offset at Corners: For surfaces meeting at corner, limit offset to 1/32 inch (0.8 mm).
4. Diagonal measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

C. Install doors without warp or rack. Adjust doors and hardware to provide ninety (90) degree operation, tight fit at contact points and smooth operation.

D. Sealants:
1. Apply in accordance with Section 07 9213 'Elastomeric Joint Sealant' requirements.

3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
   1. Pull test doors, especially pairs of single doors separated by permanent mullions, to ensure security of opening.
   2. Make all necessary final adjustments to attain normal operation of each door and its mechanical hardware.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements including removal and replacement of glass that has been broken, chipped, cracked, abraded, or damaged during construction period at no additional cost to the Owner.

3.5 ADJUSTING

A. Adjust swing doors for proper operation after glazing entry. After repeated operation of completed installation, re-adjust door for optimum operating condition and safety if required.

3.6 PROTECTION

A. During Installation:
   1. Installer's Responsibility:
      a. During installation, all adjacent work shall be protected from damage.

B. After Installation:
   1. General Contractor's Responsibility:
      a. Institute protective measures required throughout remainder of construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

3.7 CLEANING

A. General:
   1. Installer's Responsibility:
      a. Follow Manufacturer's written recommendations for cleaning and maintenance or guidelines of AAMA 609 & 610 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined documents). Avoid damaging protective coatings and finishes.
      b. Clean glass and aluminum surfaces, inside and out, promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Exercise care to avoid damage to coatings.
      c. Remove nonpermanent labels, protective films, and clean surfaces following recommended procedures.
         1) Do NOT remove permanent AAMA/CSA or NFRC labels.

B. Waste Management:
   1. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

DIVISION 10: SPECIALTIES

10 1000 INFORMATION SPECIALTIES

10 1453 TRAFFIC SIGNAGE

END OF TABLE OF CONTENTS

SECTION 10 1453

TRAFFIC SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnishing and installing of exterior post-mounted site signage as described in Contract Documents.

B. Related Requirements:
   1. Section 03 3111: ‘Cast-In-Place Structural Concrete' for quality requirements of concrete used for parking sign posts.
   2. Section 09 9112: 'Exterior Painted Ferrous Metal' for painting steel signage post.
   3. Section 09 9113: ‘Exterior Painted Galvanized Metal’ for painting galvanized signage post.

1.2 REFERENCES

A. Reference Standards:
   1. International Code Council / American National Standards Institute:
      a. ICC/ANSI A117.1-2010, ‘Accessible and Usable Buildings and Facilities'.
   2. U.S. Department of Justice:
      a. 2010 'ADA Standards for Accessible Design'.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Sign shall meet ANSI A117.1 accessibility code and ADA standards for accessible design and local and state authorities having jurisdiction (AHJ) requirements.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Permanently Mounted:
   1. Post Foundation Concrete: One cu ft cement, 2 cu ft (0.0566 cu m) sand, 4 cu ft (0.1132 cu m) gravel, and 5 gallons (18.93 liters) minimum to 6 gallons (22.71 liters) maximum of water.
   2. Accessible Parking Signs:
      a. Design Criteria:
         1) Meet regulatory agency requirements for accessibility.
         2) Sign graphics and lettering shall be minimum required by agency having jurisdiction:
            a) International symbol of accessibility should be posted on all accessible parking spaces.
            b) Letters must contain visual characters and high dark to light contrast between characters and background as per ADA requirements:
            c) Provide reflective background.
            d) Van-accessible parking spaces to have additional ‘text’ or ‘sign’ below the accessibility symbol to mark the van-accessible area specifically:
         3) Size: 12 inches (305 mm) x 18 inches (457 mm) aluminum sign.

4) Sign shall have rounded corners.
b. Type Two Acceptable Products:
1) Parking signs by My Parking Sign, Brooklyn, NY www.MyParkingSign.com.
2) Equal as approved by Architect before use. See Section 01 6200.
3. Posts:
a. Handicap Accessible Parking Signage:
1) Provide galvanized post as shown on Contract Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Permanently Mounted:
1. Locate as shown on Site Plan.
a. Follow ADA guidelines and local and state authorities having jurisdiction (AHJ) for placement of sign requirements:
1) Van accessible sign should be placed so that it is not obscured by anything including a standing van, vehicle or other obtrusive objects.
2) Signs should be placed at such a height (at least 60 inches (1 500 mm) above surface) that they do not get obscured by any parked vehicles or other obstructions. Signs must be viewable from drivers' seat of vehicle and located right in view of parking spaces.
2. Install signs square and plumb.
3. Post Foundations:
a. Follow requirements of Section 03 3053: 'Miscellaneous Exterior Cast-In-Place Concrete' for post foundation:
1) Mix concrete components thoroughly, place in post foundation holes sized as shown on Contract Drawings.
b. Mow Strips:
1) At mow strips where shown on Site Plan, set top of post foundation below grade sufficient to allow for placing of mow strip.
c. Placement Before Installation of Slabs:
1) Measure post foundation depth from top of slab. Extend bottom of slab footing sufficient to allow specified amount of concrete around post.
d. Placement After Installation of Slabs:
1) Where posts are installed after installation of slabs, core slab width of foundation diameter as shown on Contract Documents to accommodate post foundation.
4. Handicap Accessible Parking Signage:
1) Attach sign to galvanized steel posts as shown on Contract Drawings with stainless steel self tapping screws.
2) Isolate dissimilar materials (steel tube and aluminum sign).

END OF SECTION

DIVISION 31: EARTHWORK

31 0500 COMMON WORK RESULTS FOR EARTHWORK

31 0501 COMMON EARTHWORK REQUIREMENTS

31 1000 SITE CLEARING

31 1100 CLEARING AND GRUBBING
31 1123 AGGREGATE BASE

31 2000 EARTH MOVING

31 2213 ROUGH GRADING
31 2216 FINE GRADING
31 2316 EXCAVATION
31 2323 FILL

END OF TABLE OF CONTENTS

SECTION 31 0501

COMMON EARTHWORK REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited to:
   1. General procedures and requirements for earthwork.

B. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
   2. Pre-Installation conferences held jointly with Section 31 0501 as described in Administrative Requirements on Part 1 of this specification section:
   3. Section 32 9001: 'Common Planting Requirements':
      a. Pre-installation conference held jointly with other landscape related sections.

1.2 REFERENCES

A. Definitions:
   1. Aggregate Base: Layer of granular material immediately below concrete and asphalt paving or miscellaneous site concrete (sidewalks, curbs, etc) and below interior concrete slabs on grade.
   2. Base: See aggregate base.
   3. Building Grading: sloping of grounds immediately adjacent to building. Proper grading causes water to flow away from a structure. Grading can be accomplished either with machinery or by hand.
   4. Compacted Fill: Placement of soils on building site placed and compacted per Contract Documents. Used to replace soils removed during excavation or to fill in low spot on building site.
   5. Excavation: Removal of soil from project site or cavity formed by cutting, digging or scooping on project site.
   6. Fine Grading (FG): Preparation of subgrade preceding placement of surfacing materials (aggregate base, asphalt or concrete paving, and topsoil) for contour of building site required. Fine Grading is conducted to ensure that earth forms and surfaces have been properly shaped and subgrade has been brought to correct elevations. It is performed after rough grading and placement of compacted fill but before placement of aggregate base or topsoil.
   7. Finish Grading: Completed surface elevation of landscaping areas for seeding, sodding, and planting on building site.
   8. Natural Grade: Undisturbed natural surface of ground.
   9. Rough Grading (RG): Grading, leveling, moving, removal and placement of existing or imported soil to its generally required location and elevation. Cut and fill is part of rough grading.
   10. Subgrade (definition varies depending upon stage of construction and context of work being performed):
      a. Prepared natural soils on which fill, aggregate base, or topsoil is placed.
         or
      b. Prepared soils immediately beneath paving or topsoil.
   11. Topsoil Placement and Grading: Topsoil placement and finish grading work required to prepare site for installation of landscaping.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference for common earthwork sections:

a. Schedule conference after completion of site clearing but before beginning grading work.
b. Participate in pre-installation conference held jointly with following sections:
1) Section 03 3053: 'Miscellaneous Exterior Cast-In-Place Concrete'.
2) Section 31 1100: ‘Clearing and Grubbing’.
3) Section 31 1123: ‘Aggregate Base’.
4) Section 31 1413: ‘Topsoil Stripping and Stockpiling’.
5) Section 31 2213: 'Rough Grading'.
6) Section 31 2216: 'Fine Grading'.
7) Section 31 2316: ‘Excavation’.
8) Section 31 2323: ‘Fill’.
9) Section 32 1216: ‘Asphalt Paving’.
10) Section 32 1313: ‘Concrete Paving’.
c. In addition to agenda items specified in Section 01 3100, review following:
1) Review common earthwork schedule.
2) Review protection requirements.
3) Review cleaning requirements.
4) Review safety issues.
5) Review field tests and inspections requirements.
d. In addition to agenda items specified above, review following. These are items that will occur before pre-installation conference for landscape sections:
1) Review clearing and grubbing requirements.
2) Review topsoil stripping and stockpiling requirements.
3) Review landscape grading requirements.
4) Review landscape finish grade tolerance requirements.
5) Review landscape and plant tolerances.
6) Review surface preparation of landscape and planting areas.
7) Review additional agenda items as specified in related sections listed above.

2. Participate in pre-installation conference for landscape sections as specified in Section 32 9001:
a. Schedule pre-installation conference after completion of Fine Grading specified in Section 31 2216, but one (1) week minimum before beginning landscape work and held jointly with following sections:
1) Section 32 8423: ‘Underground Sprinklers’.
2) Section 32 9120: ‘Topsoil Placement’.
3) Section 32 9121: ‘Topsoil Physical Preparation’ (section included based on Topsoil Testing Report).
4) Section 32 9122: ‘Topsoil Grading’.
5) Section 32 9223: ‘Sodding’.
6) Section 32 9300: ‘Plants’.
b. In addition to agenda items specified in Section 01 3100 and Section 32 9001, review following that these items have been installed correctly:
1) Review topsoil placement requirements.
2) Review topsoil surface preparation requirements.
3) Review topsoil depth requirements.
4) Review landscape finish grade tolerance requirements.
5) Review surface preparation of landscape and planting areas.

B. Sequencing:
1. General Earthwork:
a. Excavation.
b. Rough Grading.
c. Fill.
d. Fine Grading.
e. Aggregate Base or Topsoil Grading.

1.4 QUALITY ASSURANCE

A. Testing And Inspection:
1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.

a. Owner will employ testing agencies to perform testing and inspection as specified in Field Quality Control in Part 3 of this specification:
   1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
   2) See Section 01 1200: 'Multiple Contract Summary'.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Forty eight (48) hours minimum before performing any work on site, contact DIGLINE, Dial 811, to arrange for utility location services.
   2. Perform minor, investigative excavations to verify location of various existing underground facilities at sufficient locations to assure that no conflict with the proposed work exists and sufficient clearance is available to avoid damage to existing facilities.
   3. Perform investigative excavating ten (10) days minimum in advance of performing any excavation or underground work.
   4. Upon discovery of conflicts or problems with existing facilities, notify Architect by phone or fax within twenty four (24) hours. Follow telephone or fax notification with letter and diagrams indicating conflict or problem and sufficient measurements and details to evaluate problem.

3.2 PREPARATION

A. Protection:
   1. Spillage:
      a. Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways.
      b. Remove spillage and sweep, wash, or otherwise clean project, streets, and highways.
   2. Dust Control:
      a. Take precautions necessary to prevent dust nuisance, both on-site and adjacent to public and private properties.
      b. Correct or repair damage caused by dust.
   3. Existing Plants and Features:
      a. Do not damage tops, trunks, and roots of existing trees and shrubs on site that are intended to remain.
      b. Do not use heavy equipment within branch spread.
      c. Interfering branches may be removed only with permission of Architect.
      d. Do not damage other plants and features that are to remain.

3.3 REPAIR / RESTORATION

A. Adjust existing covers, boxes, and vaults to grade.

B. Replace broken or damaged covers, boxes, and vaults.

C. Independently confirm size, location, and number of covers, boxes, and vaults that require adjustment.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections:
   1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
      a. Quality Control is sole responsibility of Contractor. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform The Work or Contractors own Testing and Inspection services.
   2. Field Tests and Laboratory Tests:
      a. Owner reserves right to require additional testing to re-affirm suitability of completed work including compacted soils that have been exposed to adverse weather conditions.
   3. Field Inspections:
      a. Notify Architect forty eight (48) hours before performing excavation or fill work.
      b. If weather, scheduling, or any other circumstance has interrupted work, notify Architect twenty four (24) hours minimum before intended resumption of grading or compacting.

B. Non-Conforming Work:
   1. If specified protection precautions are not taken or corrections and repairs are not made promptly, Owner may take such steps as may be deemed necessary and deduct costs of such from monies due to Contractor. Such action or lack of action on Owner's part does not relieve Contractor from responsibility for proper protection of The Work.

END OF SECTION

SECTION 31 1100

CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Perform clearing and grubbing as necessary to prepare site for rough grading and structure excavation as described in Contract Documents.

B. Related Requirements:
   1. Section 31 0501: Common Earthwork Requirements:
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
      c. Pre-installation conference held jointly with other landscape related sections.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conferences as specified in Section 31 0501.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Tree And Brush Removal:
   1. Cut off trees, shrubs, brush, and vegetative growth 12 inches maximum above ground.
   2. Do not pull up or rip out roots of trees and shrubs that are to remain. If excavation through roots is required, excavate by hand and cut roots with sharp axe. Make clean, smooth, sloping cuts.
   3. Cut roots 6 inches or larger in diameter only with Architect's written permission.

B. Grubbing:
   1. Grub out stumps and roots 18 inches minimum below original ground surface, except as follows:
      a. Under buildings, remove roots one inch and larger entirely.
      b. Entirely remove roots of plants that normally sprout from roots, as identified by Architect.

3.2 CLEANING

A. Remove from site, trees, shrubs, uprooted stumps, vegetative layer, and surface debris and dispose of legally.

B. Do not bury cuttings, stumps, roots, and other vegetative matter or burnt waste material on site.

END OF SECTION

SECTION 31 1123

AGGREGATE BASE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install the following as described in Contract Documents:
      a. Aggregate Base:
         1) Miscellaneous cast-in-place concrete and equipment pads.
         2) Asphalt paving.
         3) Concrete paving.

B. Related Requirements:
   1. Section 01 0000: 'General Requirements':
      a. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
      b. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
      c. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
      d. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
      e. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
      f. Section 01 6200: 'Product Options' for administrative and procedural requirements for product options.
      g. Section 01 7800: 'Closeout Submittals'.
   2. Section 31 0501: 'Common Earthwork Requirements':
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
   3. Section 31 2213: 'Rough Grading'.
   4. Section 31 2216: Subgrade procedures.
   5. Section 31 2323: Compaction procedures and tolerances.
   6. Section 32 1216: Asphalt paving.
   7. Section 32 1313: Concrete paving.

1.2 REFERENCES

A. Definitions:
   1. Aggregate (Asphalt Paving):
      a. Aggregate: A hard inert mineral material, such as gravel, crushed rock, slag, or sand.
      b. Coarse Aggregate: Aggregate retained on No. 8 (2.36 mm) sieve.
      c. Dense-Graded Aggregate: Aggregate that is graded from maximum size down through filler with object of obtaining an asphalt mix with controlled void content and high stability.
      d. Fine Aggregate: Aggregate passing No. 8 (2.36 mm) sieve.
      e. Reclaimed Asphalt Pavement (RAP): Existing asphalt mixture that has been pulverized,

Gravel (Concrete Paving):
   2. Filter Fabric: Term relating to geotextiles used in filtration applications but has also become a generic term to cover all geotextiles. Allows free liquid flow (but no soil loss) across or through plane of fabric over an indefinitely long period of time.
   3. Geomembrane: Impermeable membrane used as vapor barrier with foundation, soil, rock, earth, or any other geotechnical engineering-related material as an integral part of a project to reduce or prevent flow of fluid or vapor.

4. Geotextile: Any permeable textile used with foundation, soil, rock earth or any other geotechnical engineering related material.
5. Gravel (Concrete Paving):
   a. Gravel: Material passing 75-mm (3-inch) sieve and retained on 4.75-mm (No. 4) sieve.
   b. Coarse Gravel: Material passing 75-mm (3-inch) sieve and retained on 19.0-mm (3/4-inch) sieve.
   c. Fine Gravel: Material passing 19.0-mm (3/4-inch) sieve and retained on 4.75-mm (No. 4) sieve.
   d. Maximum Size (of aggregate) - in specifications for, or description of aggregate, smallest sieve opening through which entire amount of aggregate is required to pass.
   e. Nominal Maximum Size (of aggregate) - in specifications for, or description of aggregate, smallest sieve opening through which entire amount of aggregate is permitted to pass.
6. Nonwoven Geotextile: Textile structure produced by bonding or interlocking of fibers, or both, accomplished by mechanical, chemical or solvent means.
7. Sand (Concrete Paving):
   a. Sand: Material passing 4.75-mm sieve (No. 4) and retained on 0.075-mm (No. 200) sieve.
   b. Coarse Sand: Material passing 4.75-mm sieve (No. 4) and retained on 2.00-mm (No. 10) sieve.
   c. Medium Sand: Material passing 2.00-mm sieve (No. 10) and retained on 0.475-mm (No. 40) sieve.
   d. Find Sand: Material passing 0.475-mm (No. 40) sieve and retained on 0.075-mm (No. 200) sieve.
   e. Maximum Size (of aggregate) - in specifications for, or description of aggregate, smallest sieve opening through which entire amount of aggregate is required to pass.
   f. Nominal Maximum Size (of aggregate) - in specifications for, or description of aggregate, smallest sieve opening through which entire amount of aggregate is permitted to pass.

B. Reference Standards:
1. American Association of State Highway and Transportation Officials (AASHTO):
   a. AASHTO M288-06 (R2011), 'Standard Specification for Geotextile Specification for Highway Applications'.
2. ASTM International:
   a. ASTM C131/C131M-14, 'Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine'.
   b. ASTM D1556/D1556M-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method'.
   c. ASTM D1557-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))'.
   d. ASTM D1883-16, 'Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.
   e. ASTM D2167-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method'.
   f. ASTM D2419-14, 'Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate'.
   g. ASTM D4318-10, 'Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
1. Participate in pre-installation conference as specified in Section 31 0501.
2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
   a. Review proposed miscellaneous exterior concrete schedule.
   b. Review proposed asphalt paving schedule.
   c. Review proposed concrete paving schedule.

B. Sequencing:
1. Compaction as described in Section 31 2216 'Fine Grading'.
2. Aggregate Base:

a. Install aggregate base at location shown in Contract Drawings.

C. Scheduling:
1. Miscellaneous exterior concrete:
a. Notify Testing Agency and Architect twenty four (24) hours minimum before placing concrete for exterior site work concrete (sidewalks, curbs, gutters, etc.), footings, foundation walls, and building slabs.
2. Asphalt Paving:
a. Notify Testing Agency and Architect twenty four (24) hours minimum before placing aggregate base.
3. Concrete Paving:
a. Notify Testing Agency and Architect twenty four (24) hours minimum before placing aggregate base.

1.4 SUBMITTALS

A. Informational Submittals:
1. Qualification Statement:
a. Installer:
1) Provide Qualification documentation if requested by Architect or Owner.

B. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Testing and Inspection Reports:
a) Testing Agency Testing and Inspecting Reports of aggregate base.

1.5 QUALITY ASSURANCE

A. Testing And Inspection:
1. Owner will provide Testing and Inspection for aggregate base:
a. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
b. Owner will employ testing agencies to perform testing and inspection for aggregate base as specified in Field Quality Control in Part 3 of this specification.
1) Owner’s employment of an independent Testing Agency does not relieve Contractor of Contractor’s obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
2) See Section 01 1200: ‘Multiple Contract Summary’.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
1. Materials shall be delivered in original, unopened packages with labels intact.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Do not perform work during unfavorable conditions as specified below:
a. Aggregate Base:
1) Presence of free surface water.
2) Over-saturated subbase materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate Base:
   1. Miscellaneous exterior concrete (Section 03 3053):
      a. New Aggregate Base:
         1) Parking Base to conform to ISPWC Section 802, ¾ inch (Type I).
   2. Asphalt paving (Section 32 1216):
      a. New Aggregate Base:
         1) Parking Base to conform to ISPWC Section 802, ¾ inch (Type I).
   3. Concrete paving (Section 32 1313):
      a. New Aggregate Base:
         1) Parking Base to conform to ISPWC Section 802, ¾ inch (Type I).

PART 3 - EXECUTION

3.1 PREPARATION

A. Stockpiles:
   1. Provide area for each stockpile of adequate size, reasonably uniform in cross-section, well drained, and cleared of foreign materials.
   2. Locate piles so that there is no contamination by foreign material and no intermingling of aggregates from adjacent piles. Do not use steel-tracked equipment on stockpiles.
   3. Do not store aggregates from different sources, geological classifications, or of different gradings in stockpiles near each other unless bulkhead is placed between different materials.
   4. Do not use washed aggregates sooner than twenty four (24) hours after washing or until surplus water has drained out and material has uniform moisture content.
   5. Do not stockpile higher than 15 feet. Cover or otherwise protect stockpiles for use in HMA to prevent buildup of moisture.

B. Surface Preparation (Miscellaneous Exterior Concrete):
   1. Subgrade:
      a. Finish grade to grades required by Contract Documents.
      b. Compact subgrade as specified in Section 31 2323.

C. Surface Preparation (Asphalt Paving):
   1. Subgrade:
      a. Finish grade parking surface area to grades required by Contract Documents.
      b. Aggregate base and paving must be placed before any moisture or seasonal changes occur to subgrade that would cause compaction tests previously performed to be erroneous. Recompact and retest subgrade soils that have been left exposed to weather.

D. Surface Preparation (Concrete Paving):
   1. Subgrade:
      a. Finish grade parking surface area to grades required by Contract Documents.
      b. Aggregate base and paving must be placed before any moisture or seasonal changes occur to subgrade that would cause compaction tests previously performed to be erroneous. Recompact and retest subgrade soils that have been left exposed to weather.

3.2 INSTALLATION

A. Aggregate Base:
   1. Place 4 inches minimum of aggregate base under vapor retarder, level, and compact with vibratory plate compactor.

2. Miscellaneous exterior concrete:
   a. Except under mow strips, place 4 inches minimum of aggregate base, level, and compact as specified in Section 31 2323.
3. Asphalt base:
   a. If roller is smaller than 8 ton (7260 kg), lay aggregate base and compact in two courses.
   b. Compact as specified in Section 31 2323.
   c. Priming: Prime aggregate base with application of 0.2 to 0.5 gallons of asphalt cement primer per square yard if pavement will be laid more than three days after compaction of aggregate base, or if precipitation is anticipated between completion of compaction of aggregate base and laying of asphalt paving.
   d. Recompact unprimed aggregate base if it receives precipitation before pavement is laid.
   e. Remove or repair improperly prepared areas as directed by Architect.
4. Concrete paving:
   a. Compact to 95 percent minimum density as determined by ASTM D698.
   b. Remove or repair improperly prepared areas as directed by Architect.
5. Aggregate Base:
   a. Asphalt paving areas:
      1) Subgrade: 0.00 inches high. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
      2) Aggregate base shall be 6 inches thick minimum after compaction, except where shown thicker on Drawings.
      3) Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
   b. Concrete paving areas:
      1) Finished base course shall be 4 inches thick minimum, except where shown thicker on Drawings, after compaction and true to line and grade within plus or minus 1/4 inch in 10 feet.

3.3 FIELD QUALITY CONTROL

A. Field Tests and Inspections:
   a. Miscellaneous exterior concrete areas:
      1) Testing Agency shall provide testing and inspection for exterior aggregate base.
      2) Number of tests may vary at discretion of Architect.
      3) Testing Agency will test compaction of base in place according to ASTM D1556, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
         a) Sitework Areas: One test for every 10,000 sq. ft.or less of exterior pads area but no fewer than three tests.
   b. Asphalt paving area:
      1) Testing Agency shall provide testing and inspection for exterior aggregate base.
      2) Number of tests may vary at discretion of Architect.
      3) Testing Agency will test compaction of base in place according to ASTM D1556, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
         a) Sitework Areas: One test for every 10,000 sq. ft. or less of exterior pads area but no fewer than three tests.
   c. Concrete paving area:
      1) Testing Agency shall provide testing and inspection for exterior aggregate base.
      2) Number of tests may vary at discretion of Architect.
      3) Testing Agency will test compaction of base in place according to ASTM D1556, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
         a) Sitework Areas: One test for every 10,000 sq. ft. or less of exterior pads area but no fewer than three tests.

END OF SECTION

SECTION 31 2213

ROUGH GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
   1. Perform rough grading work required to prepare site for construction as described in Contract Documents.

B. Related Requirements:
   1. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   2. Section 03 3053: Miscellaneous Exterior Cast-In-Place Concrete.
   3. Section 31 0501: 'Common Earthwork Requirements':
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
   4. Section 31 1123: 'Aggregate Base' for aggregate base requirements.
   5. Section 31 1413: 'Topsoil Stripping And Stockpiling' for stripping and storing of existing topsoil.
   6. Section 31 2216: 'Fine Grading' for grading of subgrade below aggregate base and topsoil.
   7. Section 31 2316: 'Excavation'.
   8. Section 31 2323: 'Fill' for compaction procedures and tolerances for base.
   9. Section 32 1216: 'Asphalt Paving'.
   10. Section 32 1313: 'Concrete Paving'.
   11. Section 32 9122: 'Topsoil Grading' for preparation of topsoil and addition of amendments prior to landscaping.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 31 0501:
   2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
      a. Identify benchmark to be used in establishing grades and review Contract Document requirements for grades, fill materials, and topsoil.
      b. Examine site to pre-plan procedures for making cuts, placing fills, and other necessary work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials used for fill shall be as specified for backfill in Section 31 2323 'Fill'.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Verify elevations of rough grading are correct before compacted fill, fine grading, aggregate base or landscape grading are placed.

3.2 PREPARATION

A. Protection of In-Place Conditions:
   1. When existing grade around existing plants to remain is higher than new finish grade, perform regrading by hand.
   2. Do not expose or damage shrub or tree roots.

3.3 PERFORMANCE

A. Subgrade (Natural Soils):
   1. Subgrade beneath compacted fill or aggregate base under asphalt or concrete paving shall be constructed smooth and even.

B. Special Techniques:
   1. Compact fills as specified in Section 31 2323 'Fill'.
   2. If soft spots, water, or other unusual and unforeseen conditions affecting grading requirements are encountered, stop work and notify Architect.

C. Tolerances:
   1. Maximum variation from required grades shall be 1/10 of one foot.

END OF SECTION

SECTION 31 2216

FINE GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Perform fine grading work required to prepare site for paving finish grading and for landscape finish grading as described in Contract Documents.
   2. Prepare subgrade as described in Contract Documents to receive aggregate base for asphalt paving.
   3. Prepare subgrade as described in Contract Documents to receive aggregate base for concrete paving.

B. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
   2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   3. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   6. Section 01 7800: 'Closeout Submittals'.
   7. Section 31 0501: 'Common Earthwork Requirements' for:
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
   8. Section 31 1123: 'Aggregate Base' for aggregate base requirements.
   9. Section 31 2213: 'Rough Grading' for grading and preparation of natural soil subgrades below fill and aggregate base materials.
   10. Section 31 2316: 'Excavation'.
   11. Section 31 2323: 'Fill' for compaction procedures and tolerances for base.
   12. Section 32 1216: 'Asphalt Paving' for finish grading for asphalt paving.
   13. Section 32 1313: 'Concrete Paving' for finish grading for concrete paving.
   14. Section 32 9121: 'Topsoil Physical Preparation' for physical preparation of topsoil (section included based on Topsoil Testing Report).
   15. Section 32 9122: 'Topsoil Grading' for preparation of topsoil and addition of amendments prior to landscaping.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 31 0501.
   2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
      a. Review backfill requirements.
      b. Review geotechnical report.
      c. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
         1) Review frequency of testing and inspections.
         2) Review Landscape Grading requirements.

B. Scheduling:

1. Notify Testing Agency and Architect twenty four (24) hours minimum before installation of fill / engineered fill to allow inspection.
2. Allow special inspector to review all subgrades and excavations to determine if site has been prepared in accordance with geotechnical report prior to placing any fill (or concrete).
3. Allow inspection and testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after inspections and test results for previously compacted work comply with requirements.

1.3 SUBMITTALS

A. Closeout Submittals:
   1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Testing and Inspection Reports:
            a) Testing Agency Testing and Inspecting Reports of fill / engineered fill.

1.4 QUALITY ASSURANCE

A. Testing and Inspection:
   1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
   2. Owner will provide Testing and Inspection for fill / engineering fill:
      a. Owner will employ testing agencies to perform testing and inspection for fill / engineering fill as specified in Field Quality Control in Part 3 of this specification.
         1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
         2) See Section 01 1200: 'Multiple Contract Summary'.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions: Protect utilities and site elements from damage.

B. Surface Preparation:
   1. Landscaping and Planting Areas:
      a. Before grading, dig out weeds from planting areas by their roots and remove from site. Remove rocks larger than 1-1/2 inches in size and foreign matter such as building rubble, wire, cans, sticks, concrete, etc.
      b. Remove imported paving base material present in planting areas down to natural subgrade or other material acceptable to Architect.
      c. Limit use of heavy equipment to areas no closer than 6 feet from building or other permanent structures.
   2. Asphalt Paving:
      a. Survey and stake parking surfaces to show grading required by Contract Documents.
      b. Subgrade:
         1) Fine grade parking surface area to grades required by Contract Documents.
         2) Compact subgrade as specified in Section 31 2323.
   3. Concrete Paving:
      a. Survey and stake parking surfaces to show grading required by Contract Documents.
      b. Subgrade:

1) Fine grade parking surface area to grades required by Contract Documents.
2) Compact subgrade as specified in Section 31 2323.

3.2 PERFORMANCE

A. Interface With Other Work: Do not commence work of this Section until grading tolerances specified in Section 31 2213 are met.

B. General:
1. Do not expose or damage existing shrub or tree roots.

C. Tolerances:
1. Site Tolerances:
a. Subgrade: 1 inch high. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
b. Maximum variation from required grades shall be 1/10 of one foot.
2. Aggregate Base (Asphalt paving) Tolerances:
a. Aggregate base shall be 4 inches thick minimum after compaction, except where shown thicker on Drawings.
b. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
3. Aggregate Base (Concrete paving) Tolerances:
a. Finished base course shall be 4 inches thick minimum after compaction and true to line and grade within plus or minus 1/4 inch in 10 feet.
4. Landscaping and Planting Tolerances:
a. Maximum variation from required grades shall be 1/10 of one foot.
b. To allow for final finish grades as specified in Section 32 9119 of planting areas, fine grade elevations before placing topsoil and mulch are:
1) Sod Areas: 7 inches below top of walk or curb.
2) Tree and Shrub Areas: 6 inches below top of walk or curb.

3.3 FIELD QUALITY CONTROL

A. Field Tests and Inspections:
1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing and Inspection Services':
a. Quality Control is sole responsibility of Contractor:
1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Site Preparation:
a. Prior to placement of fill / engineered fill, inspector shall determine that site has been prepared in accordance with geotechnical report.
b. Footing subgrade: At footing subgrades, Certified Inspector is to verify that soils conform to geotechnical report.
3. Fill / Engineered Fill:
a. Testing Agency shall provide testing and inspection for fine grading.
b. Number of tests may vary at discretion of Architect.
c. Testing Agency is to provide one (1) moisture-maximum density relationship test for each type of fill material.

END OF SECTION

SECTION 31 2316

EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
   1. Perform Project excavating and trenching as described in Contract Documents, except as specified below.
   2. Procedure and quality for excavating and trenching performed on Project under other Sections unless specifically specified otherwise.

B. Related Requirements:
   1. Section 31 0501: Common Earthwork Requirements:
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
   2. Section 31 1100: Clearing and Grubbing.
   3. Section 31 1123: 'Aggregate Base'.
   4. Section 31 2213: 'Rough Grading' for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
   5. Section 31 2216: 'Fine Grading' for grading of subgrade below aggregate base and topsoil.
   6. Section 31 2323: 'Fill' for compaction procedures and tolerances for base.
   7. Performance of excavating inside and outside of building required for electrical and mechanical work is responsibility of respective Section doing work unless arranged differently by Contractor.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 31 0501:
   2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
      a. Review protection of existing utilities requirements.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Carefully examine site and available information to determine type of soil to be encountered.
   2. Discuss problems with Architect before proceeding with work.

3.2 PREPARATION

A. Protection of Existing Utilities:
   1. Protect existing utilities identified in Contract Documents during excavation.
   2. If existing utility lines not identified in Contract Documents are encountered, contact Architect before proceeding.

3.3 PERFORMANCE

A. Excavation:
   1. Pavement and Miscellaneous Cast-In-Place Concrete:
      a. Excavate as necessary for proper placement and forming of concrete site elements and pavement structure. Remove vegetation and deleterious material and remove from site.
      b. Backfill over-excavated areas with compacted base material specified in Section 31 1123.
      c. Remove and replace exposed material that becomes soft or unstable.
   2. Utility Trenches:
      a. Unless otherwise indicated, excavation shall be open cut. Short sections of trench may be tunneled if pipe or duct can be safely and properly installed and backfill can be properly tamped in tunnel sections and if approved by Architect.
      b. Excavate to proper alignment, depth, and grade. Excavate to sufficient width to allow adequate space for proper installation and inspection of utility piping.
      c. If trenches are excavated deeper than required, backfill until trench bottom is proper depth with properly compacted native material.
      d. Pipe 4 Inches in Diameter or Larger:
         1) Grade bottom of trenches to provide uniform bearing and support for each section of pipe on undisturbed soil at every point along its length.
         2) Except where rock is encountered, take care not to excavate below depths indicated.
            a) Where rock excavations are required, excavate rock with minimum over-depth of 4 inches below required trench depths.
            b) Backfill over-depths in rock excavation and unauthorized over-depths with loose, granular, moist earth, thoroughly compacted.
         3) Whenever wet or unstable soil incapable of properly supporting pipe, as determined by Architect, occurs in bottom of trench, remove soil to depth required and backfill trench to proper grade with coarse sand, fine gravel, or other suitable material acceptable to Architect.
   3. If unusual excavating conditions are encountered, stop work and notify Architect.

3.4 REPAIR / RESTORATION

A. Repair damage to other portions of the Work resulting from work of this Section at no additional cost to Owner. On new work, arrange for damage to be repaired by original installer.

3.5 CLEANING

A. Debris and material not necessary for Project are property of Contractor and are to be removed before completion of Project. However, if material necessary for Project is hauled away, replace with specified fill / backfill material.

END OF SECTION

SECTION 31 2323

FILL

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
   1. Perform Project backfilling and compacting as described in Contract Documents, except as specified below.
   2. Procedure and quality for backfilling and compacting performed on Project under other Sections unless specifically specified otherwise.

B. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
   2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   3. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   6. Section 01 7800: 'Closeout Submittals'.
   7. Section 31 0501: 'Common Earthwork Requirements' for:
      a. General procedures and requirements for earthwork.
      b. Pre-installation conference held jointly with other common earthwork related sections.
   8. Section 31 1100: 'Clearing and Grubbing'.
   9. Section 31 1123: 'Aggregate Base' for aggregate base requirements.
   10. Section 31 2213: 'Rough Grading' for grading and preparation of natural soil subgrades below fill and aggregate base materials.
   11. Section 31 2216: 'Fine Grading' for grading of subgrade below aggregate base and topsoil.
   12. Section 31 2316: 'Excavation'.
   13. Section 32 9121: 'Topsoil Physical Preparation' for physical preparation of topsoil (section included based on Topsoil Testing Report).
   14. Section 32 9122: 'Topsoil Grading' for preparation of topsoil and addition of amendments prior to landscaping.
   15. Division 32: Compaction of subgrade under walks and paving.
   16. Performance of backfilling and compacting inside and outside of building required for electrical and mechanical work is responsibility of respective Section doing work unless arranged differently by Contractor.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International (Following are specifically referenced for fill and aggregate base testing):
      a. ASTM D698-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))'.
      b. ASTM D1556/D1556M-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method'.
      c. ASTM D1557-12, 'Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))'.
      d. ASTM D2167-15, 'Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method'.

e. ASTM D2487-11, 'Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)'.
f. ASTM D6938-15, 'Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
1. Participate in pre-installation conference as specified in Section 31 0501.
2. In addition to agenda items specified in Section 01 3100 and Section 31 0501, review following:
a. Review backfill requirements.
b. Review Geotechnical Evaluation Report.
c. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
1) Review frequency of testing and inspections.

B. Scheduling:
1. Notify Testing Agency and Architect seventy two (72) hours minimum before installation of fill / engineered fill to perform proctor and plasticity index tests on proposed fill or subgrade.
2. Notify Testing Agency and Architect forty eight (48) hours minimum before installation of fill / engineered fill to allow inspection.
3. Allow special inspector to review all subgrades and excavations to determine if site has been prepared in accordance with geotechnical report prior to placing any fill (or concrete).
4. Allow inspection and testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after inspections and test results for previously compacted work comply with requirements.

1.4 SUBMITTALS

A. Closeout Submittals:
1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Testing and Inspection Reports:
a) Testing Agency Testing and Inspecting Reports of fill / engineered fill.

1.5 QUALITY ASSURANCE

A. Testing and Inspection:
1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2. Owner will provide Testing and Inspection for fill / engineering fill:
a. Owner will employ testing agencies to perform testing and inspection for fill / engineering fill as specified in Field Quality Control in Part 3 of this specification.
1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
2) See Section 01 1200: 'Multiple Contract Summary'.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Site Material:

1. Existing excavated material on site is not suitable for reuse as fill and backfill in flexible and rigid pavement areas to meet Project requirements.

B. Imported Fill / Backfill:
   1. Well graded material conforming to ASTM D2487 free from debris, organic material, frozen materials, brick, lime, concrete, and other material which would prevent adequate performance of backfill.
      a. Under Landscaped Areas:
         1) Fill more than 36 inches below finish grade shall comply with soil classification groups GW, GP, GM, SW, SP, or SM. Fill may not contain stones over 6 inches diameter and 90 percent minimum of fill shall be smaller than 1-1/2 inch in any direction.
         2) Fill less than 36 inches below finish grade shall comply with soil classification groups SW, SP, SM, or SC. Fill may not contain stones larger than 1-1/2 inches in any direction and 90 percent minimum of fill shall be smaller than 3/8 inch in any direction.

C. Engineered Imported Fill:
   1. ISPWC Section 801, 3-inch or 6-inch minus uncrushed aggregate.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before placing fill, base, or finish work, prepare subgrade as follows:
   1. Do not place fill or base over frozen subgrade.
   2. Under Concrete Site Element Areas: Remove all disturbed materials, plow zones, and organic materials. Subgrade soils shall be inspected by the Geotechnical Engineer. Subgrade should be undisturbed prior to the placement of base material.
   3. Under Asphalt Removal and Replacement Areas: Remove all existing asphalt. Underlying aggregate and existing subbase material shall be removed to new section depth. Existing underlying aggregate can be recycled into the reconstructed pavement section as subbase, provided the existing aggregate does not become contaminated with other materials. Verification of subgrade competence is required by the Geotechnical Engineer.
   4. Landscape Areas: Compact subgrade to 85 percent maximum dry density.

3.2 PERFORMANCE

A. Interface with Other Work:
   1. Section 31 2213: ‘Rough Grading’ for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
   2. Section 31 2216: ‘Fine Grading’ for grading of subgrade below aggregate base and topsoil.

B. Fill / Backfill:
   1. General:
      a. Site Utilities:
         1) In Landscape Areas: Use backfill consisting of on-site soil.
         2) Under Pavement and Concrete Site Elements: Extend excavatable flowable fill / backfill to elevation of subgrade. Do not place base material until excavatable flowable fill / backfill has cured seventy two (72) hours.
      b. Do not use puddling or jetting to consolidate fill areas.
   2. Compacting:
      a. Fill / Backfill and Aggregate Base:
         1) Under Driveways and Parking Areas: Place in 8 inch maximum layers, moisture condition to plus or minus 2 percent of optimum moisture content, and mechanically tamp to 95 percent minimum of maximum density as established by ASTM D1557.

2) Under Concrete Site Elements: Place in 8-inch maximum layers, dampen but do not soak, and mechanically tamp to 95 percent minimum of maximum dry density as established by ASTM D1557.
3) Utility Trenches:
    a) Site: Place fill in 12-inch layers and moisture condition to plus or minus 2 percent of optimum moisture content. Compact fill to 95 percent maximum dry density to within 12 inches of finish grade. Compact fill deeper than 12 inches to 92 percent maximum dry density.
    b) Under Slabs: Place fill in 6-inch layers, moisture condition to plus or minus 2 percent of optimum moisture content, and compact to 95 percent maximum dry density to within 4 inches of finish grade. Final 4 inches of fill shall be aggregate base as specified in Section 31 1123.
4) Fill Slopes: Compact by rolling or using sheepsfoot roller.

3.3 REPAIR / RESTORATION

A. Repair damage to other portions of the Work resulting from work of this Section at no additional cost to Owner. On new work, arrange for damage to be repaired by original installer.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections:
1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing and Inspection Services':
    a. Quality Control is sole responsibility of Contractor:
        1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
            a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Fill / Engineered Fill:
    a. Testing Agency shall provide testing and inspection for fill.
    b. Number of tests may vary at discretion of Architect.
    c. Testing Agency is to provide one (1) moisture-maximum density relationship test for each type of fill material.
    d. Prior to placement of engineered fill, inspector shall determine that site has been prepared in accordance with geotechnical report.
    e. Footing subgrade: At footing subgrades Certified Inspector is to verify that soils conform to geotechnical report.
    f. Testing Agency will test compaction of soils according to ASTM D1556, ASTM D2167, and ASTM D6938, as applicable. Lift thicknesses shall comply with geotechnical report. Inspector shall determine that in-place dry density of engineered fill material complies with geotechnical report. Tests will be performed at following locations and frequencies:
        1) Paved Areas: At each compacted fill and backfill layer, at least one (1) test for every 10,000 sq. ft. or less of paved area but in no case less than three (3) tests.
        2) Trench Backfill: At each 12-inch compacted lift for each 100 linear feet or less of trench length but no fewer than two (2) tests.
        3) Sidewalks, Curbs, Gutters, Exterior Pads: Minimum of one (1) test for each lift for each 40 lineal feet or one (1) test for every 5,000 sq. ft. or less of pad area but no fewer than three (3) tests.
    g. Required verification and inspection of soils as referenced in 2018 IBC Table 1705.6. Periodic and continuous inspections include:
        1) Verify materials below shallow foundations are adequate to achieve design bearing capacity (periodic).
        2) Verify excavations are extended to proper depth and have reached proper material (periodic).
        3) Perform classification and testing of compacted fill materials (periodic).

4) Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill (continuous).
5) Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly (periodic).

3.5 CLEANING

A. Debris and material not necessary for Project are property of Contractor and are to be removed before completion of Project. However, if material necessary for Project is hauled away, replace with specified fill / backfill material.

END OF SECTION

DIVISION 32: EXTERIOR IMPROVEMENTS

32 0100 OPERATION AND MAINTENACE OF EXTERIOR IMPROVEMENTS

32 0113 ASPHALT PAVING SURFACE TREATMENT: ASPHALT BASE PENETRATION SEAL

32 1000 BASES, BALLASTS, AND PAVING

32 1216 ASPHALT PAVING - SUPERPAVE
32 1723 PAVEMENT MARKINGS

32 3000 SITE IMPROVEMENTS

32 3113 CHAIN LINK FENCES AND GATES

32 9000 PLANTING

32 9120 TOPSOIL AND PLACEMENT
32 9121 TOPSOIL PHYSICAL PREPARATION
32 9122 TOPSOIL GRADING
32 9223 SODDING

END OF TABLE OF CONTENTS

SECTION 32 0113

ASPHALT PAVING SURFACE TREATMENT: Asphalt Based Emulsion Seal

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
1. Furnish and install asphalt based emulsion seal on existing asphaltic concrete paving as described in Contract Documents.

B. Related Requirements:
1. Section 01 0000: 'General Requirements':
   a. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   b. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
   c. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
   d. Section 01 7800: 'Closeout Submittals'.
2. Section 32 0117.01: 'Asphalt Paving Crack Seal' for completion of crack repair.
3. Section 32 0117.02: 'Asphalt Paving Crack Fill' for completion of crack repair.
4. Section 32 0118: 'Asphalt Paving Repair – Full Depth Patch'.
5. Section 32 1723: 'Pavement Markings'.

1.2 REFERENCES

A. Association Publications:
1. Asphalt Institute:
   a. MS-4, '*The Asphalt Handbook'* (Seventh Edition).
   b. MS-16, '*Asphalt in Pavement Preservation and Maintenance'* (Fourth Edition).
2. Asphalt Emulsion Manufacturers Association:
   a. MS-19, '*Basic Asphalt Emulsion Manual'* (Fourth Edition).
3. Asphalt Sealcoat Manufacturers Association (ASMA), Sacramento, CA www.sealcoatmfg.org:
   a. *'Standard Specifications'* (Latest Edition).

B. Definitions:
1. Asphalt Emulsion: An emulsion of asphalt cement and water that contains a small amount of an emulsifying agent. Emulsified asphalt droplets may be of either anionic (negative charge) or cationic (positive charge).
2. Refined Coal Tar Emulsion: Refined coal tar is produced from "crude coal tar", a byproduct of manufacturing steel in coking ovens. Refined coal tar emulsion is an emulsion of refined coal tar and water that contains a small amount of emulsifying agent. This is combined with, mineral aggregates, sand, polymers and other additives for a seal.
3. Sand: Fine aggregate resulting from natural disintegration and abrasion of rock or processing of completely friable sandstone.
4. Sand: Fine aggregate resulting from natural disintegration and abrasion of rock or processing of completely friable sandstone.
5. Seal Coat: Thin surface treatment used to improve surface texture and protect asphalt surface. Main types of surface treatments are asphalt based emulsion seals, cape seals, chip seals, fog seals, micro surfacing, penetrating seals, refined coal tar emulsion seals, sand seals, sandwich seals and slurry seals.
6. Tack Coat: Very light application of liquid asphalt, cutback asphalt, or asphalt emulsion diluted with water applied to highly oxidized or weathered asphalt surfaces.

C. Reference Standards:
1. ASTM International:
a. ASTM C136/C136M-14, ‘Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates’.
b. ASTM D217-17, ‘Standard Test Methods for Cone Penetration of Lubricating Grease’.
c. ASTM D244-09(2017), ‘Standard Test Methods and Practices for Emulsified Asphalts’.
d. ASTM D562-10(2018), ‘Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer’.
e. ASTM D977-17, 'Standard Specification for Emulsified Asphalt'.
f. ASTM D2042-15, ‘Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene’.
g. ASTM D2397/D2397M-17, 'Standard Specification for Cationic Emulsified Asphalt'.
h. ASTM D3910-15, ‘Standard Practices for Design, Testing, and Construction of Slurry Seal’.
i. ASTM D4552-10/D4552M-10(2016), ‘Standard Practice for Classifying Hot-Mix Recycling Agents'.
2. American Association of State and Highway Transportation Officials:
a. AASHTO T 59-15, ‘Standard Method of Test for Emulsified Asphalts’.
3. Federal Specifications and Standards:
a. Federal Specification TT-C-555B, ‘Coating, Textured (For Interior and Exterior Masonry Surfaces’, Section 3.3.3: Resistance to Wind-Driven Rain (1973).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
1. Participate in pre-installation conference as specified in Section 01 3100:
2. Schedule asphalt based emulsion seal pre-installation conference to be held jointly with any other 'Asphalt Surface Treatment' sections involving asphalt maintenance.
3. In addition to agenda items specified in Section 01 3100, review following:
a. Review crack repair schedule and verify that other repairs will be completed before application of asphalt based emulsion seal.
b. Review asphalt based emulsion seal schedule.
c. Review asphalt based emulsion seal mix design.
d. Review asphalt based emulsion seal preparation requirements.
e. Review asphalt based emulsion seal application rate requirements.
f. Review use of tack coat on existing surfaces.
g. Review safety issues.

B. Scheduling:
1. Provide to Owner’s Representative at least seven (7) days before asphalt based emulsion seal placement commences, approved Laboratory Report and Manufacturer’s Certificate of compliance with these specifications covering specific materials to be used on this project.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
a. Asphalt Based Emulsion Seal:
1) Asphalt Manufacturer’s product literature.

B. Informational Submittals:
1. Certificates:
a. Manufacturer’s Certificate of compliance with these specifications covering specific materials used on this project.
2. Design Data Submittals:
a. Asphalt Based Emulsion Seal:
1) Application Rate (based on two (2) separate asphalt based emulsion seal coats of undiluted material):

a) Smooth dense surface: 20 gallons total per 1,000 sq ft.
b) Medium surface: 30 gallons total per 1,000 sq ft.
c) Rough, aged surface: 40 gallons total per 1,000 sq ft.
d) Excessively rough, aged surface: 50 gallons total per 1,000 sq ft.

3. Test And Evaluation Reports:
   a. Laboratory Report of tests showing compliance with these specifications of specific materials used on this project.
4. Manufacturers' Instructions:
   a. Asphalt Based Emulsion Seal:
      1) Mix design is to be submitted with substrate preparation and sealant application instructions.
5. Source Quality Control Submittals:
   a. Provide recommended aggregate meeting Part 2 'Materials' requirements of this specification.
   b. Provide quantities of each material delivered to job site and used on project.
6. Field Quality Control Submittals:
   a. Provide Scale Tags with following information:
      1) Product Name.
      2) Project Number.
      3) Gallons/liters and pounds/kilograms of undiluted material supplied and used for Project.
         a) Provide the amount of undiluted material used in terms of total gallons used, gallons per 1000/square feet used and square feet/gallon used.
         b) Provide the amount of diluted material in terms of total gallons used, gallons per 1000/square feet used and square feet/gallon used.
      4) Amount of water added to undiluted material.
7. Qualification Statement:
   a. Installer / Supervisor:
      1) Provide Qualification documentation if requested by Owner's Representative.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Manufacturer's documentation:
            a) Asphalt Based Emulsion Seal:
               (1) Manufacturer's product literature.
               (2) Design Data Submittal for Application Rate of Asphalt Based Emulsion Seal.
               (3) Source Quality Control Submittal.

1.5 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies but not limited to following:
   1. Installer:
      a. Minimum five (5) years experience in asphalt surface treatment installations.
      b. Minimum five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding:
         1) Project names and addresses.
         2) Date of installations.
   2. Supervisor:
      a. Minimum of five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity in past five (5) years as Supervisor of Applicators:
         1) Project names and addresses.
         2) Date of installation.
         3) Name of Supervisor or Owner.

1.6 FIELD CONDITIONS

A. Ambient Conditions:

1. Asphalt Based Emulsion Seal:
   a. Do not apply asphalt based emulsion seal when ambient temperatures will be less than 55 deg F for twenty four (24) hour period or surface temperature will be less than 60 deg F for twenty four (24) hour period.
   b. Do not apply if subsequent temperatures for forty-eight (48) hours are anticipated to drop below 50 deg F.
   c. Do not apply asphalt based emulsion seal if emulsion seal will not cure prior to freezing temperatures.
   d. Do not apply asphalt based emulsion seal if it will be affected by rain, or during rain or when surface contains standing water.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
   1. Design Criteria:
      a. Meet following requirements:
         1) Manufacturers whose products meet requirements including Design Criteria of this Section.
   2. Type One Acceptable Manufacturers and Products:
      a. Asphalt Systems, Inc., Salt Lake City, UT (801) 972-6433 www.asphaltsystemsinc.com.
      b. Ergon Asphalt & Emulsions, Inc., Jackson, MS www.ergonasphalt.com.
      c. Invia Pavement Technologies, San Antonio, TX www.invia-tech.com.
      d. Neyra Construction, Inc. Cincinnati, OH www.neyraconstruction.com.
      e. Nu Rock Asphalt Coatings, Clearfield, UT www.nurockcoatings.com.
      f. Quality Emulsions LLC, Lehi, UT www.newqualityemulsions.homestead.com.
      g. Seal Coat Supply, Layton UT www.sealcoatsupply.com.
      h. SealMaster, Sandusky, OH www.sealmaster.net.
      i. Equal as approved by Owner's Representative before bidding. See Section 01 6200.

2.2 DESIGN CRITERIA

A. Asphalt Based Emulsion Seal:
   1. Base Emulsion:
      a. Meet requirements of ASTM D977, Grade CSS-1h or meet requirements of AASHTO T 59-UL, Grade SS-1h.
   2. Materials, as manufactured, undiluted, except as noted, shall conform to following requirements:

		Minimum	Maximum	Method
a.	Weight (per gallon/liter)	10.0 lbs (4.5 kg)		ASTM D244
b.	Cone Penetration	340 mm	700 mm	ASTM D217
c.	% Non-Volatile	50		ASMA Standard Specification*
d.	% Non-Volatile Soluble in Tri-Clorethylene	10	35	ASTM D2042
e.	Wet Track Abrasion		35 gram loss	ASTM D3910
f.	Mineral Aggregate Components	#16 Sieve 100% passing		ASTM C136/C136M
g.	Dried Film Color Viscosity	Black 75 KREB		ASTM D562

h.	Accelerated Weathering	No Deterioration		Fed Spec TT-C-555B
i.	Residual Asphalt	20% by weight		
j.	Water		40% maximum by weight	
k.	Residual Solids	60% by weight		
	Latex Additive: Add at rate of 2.5 parts latex to 100 parts undiluted material.			

*weigh 10 grams of homogenous product into previously tared, small ointment can. Place in a constant temperature oven at 325 degrees F for 90 minutes. Cool, reweigh and calculate non-volatile components.

2.3 MATERIALS

A. Asphalt Based Emulsion Seal:
   1. Design Criteria:
      a. Manufacturer's Certification of compliance required.
   2. Type One Acceptable Products:
      a. Asphalt Systems: GSB – Seal Coat.
      b. Ergon Asphalt: Plastic Seal.
      c. Invia: Axys Mastic Surface Treatment.
      d. Nevra: PaveShield.
      e. Nu Coal: Axys Mastic Surface Treatment.
      f. Quality Seal LLC: Quality Seal.
      g. Seal Coat Supply: Tuff Coat.
      h. SealMaster: Polymer Modified MasterSeal (PMM).
      i. Equal as approved by Owner’s Representative before bidding. See Section 01 6200.

B. Tack Coat:
      a. Design Criteria:
         1) Apply Tack Coat if determined in the Evaluation and Assessment in Part 3 of this specification with Owner's Representative and included in bid.
         2) Tack coat is recommended when using asphalt emulsion based sealcoat over pavement previously treated with coal tar. It is preferred to let coal tar wear out before applying an asphalt based emulsion seal.
         3) Use tack coat on older pavements that are highly oxidized or weathered and show signs of raveling, and surface distress to improve sealer adhesion.
         4) Use tack coat if existing paving cannot be thoroughly cleaned.
         5) Tack coat is not to be considered as one of two (2) required applications of refined coal tar emulsion seal.
         6) Same type of asphalt used in asphalt based emulsion seal is to be used for tack coat.
         7) Use tack coat when using asphalt emulsion based sealcoat over pavement previously treated with coal tar. It is preferred to let coal tar wear out before applying an asphalt based emulsion seal.
         8) Manufacturer's Certification of compliance required.
      2. Type One Acceptable Products:
         a. GSB-78 Pavement Sealer and Rejuvenator by Asphalt Systems.
         b. Equal product that meets design criteria for tack coat as approved by Owner’s Representative before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Evaluation And Assessment:
   1. Examine Project Site with Owner's Representative prior to bid with Contractor:
      a. Asphalt Based Emulsion Seal Coats: Determine if additional asphalt based emulsion seal coats are necessary to attain Manufacturer's recommended coverage including the following:
         1) Additional third coat of asphalt based emulsion seal coat required everywhere.
         2) Additional third coat asphalt based emulsion seal coat required in drive aisles and entries only.
      b. Paint Stripes: Verify if acrylic, thermoplastic or paint stripes must be removed in preparation of asphalt based emulsion seal application.
      c. Tack Coat: Determine if tack coat is to be used and if used, what type and amount of tack coat to be used.

3.2 PREPARATION

A. General:
   1. Do not allow irrigation watering for at least twenty-four (24) hours prior to application.

B. Equipment:
   1. Spray Equipment:
      a. Capable of spraying pavement asphalt based emulsion seal with sand added.
      b. Equipped with positive displacement pumps to ensure uniform application of sealer.
   2. Self-Propelled Squeegee:
      a. Provide at least two (2) squeegee or brush devices (one behind the other) to assure adequate distribution and penetration of asphalt based emulsion seal into bituminous pavement.
   3. Mechanical Squeegee:
      a. Provide at least two (2) squeegee and/or brush assemblies (one behind the other) to assure adequate distribution and uniform application of refined coal tar emulsion seal.
   4. Hand Squeegee and Brushes:
      a. Use of hand squeegee or brushes is restricted to areas not accessible to mechanized equipment or to accommodate neat trim work at curbs, parking stops and so forth.
      b. Acceptable in areas where practicality prohibits use of mechanized equipment.
   5. Equipment used must be capable of keeping material thoroughly mixed and homogeneous throughout application process.
   6. Equipment used must be capable of supplying sufficient quantity of material for uniform application over entire width of application mechanism to provide uniformly coated surface.

C. Protection Of In-Place Conditions:
   1. Asphalt Based Emulsion Seal:
      a. Protect sign posts, street lamp posts, trees, shrubs, and tops of curbs and gutters from being discolored by splashing asphaltic material.

D. Surface Preparation:
   1. Paint Stripes:
      a. During Evaluation and Assessment as specified in Part 3 of this specification, verify if acrylic, thermoplastic or paint stripes must be removed in preparation for asphalt based emulsion seal application.
      b. If new paint stripes will not match exact location of existing paint stripes that will not be removed, then paint stripes must be removed or be covered with black acetone based paint.
   2. Grease or Oil Patches:
      a. Remove grease or oil patches, and spillage of any material that has adhered to pavement. Do not place seal over unsound oil spots softened by fuel or oil.

b. Clean oil spots and treat with oil spot primer.
c. Seal areas damaged by oil or grease with an oil spot primer compatible with tack coat or seal being used in accordance with Manufacturer's recommendations.

3. Cleaning:
   a. Remove all debris, dirt, dust, leaves, loose material, moisture, mud spots, sand, silt spots, vegetation (including moss), water and other objectionable and foreign material from existing surface prior to placing tack or seal. In areas where moss is prevalent, apply herbicide.
   b. Power brooms, power blowers, air compressors, vacuum sweepers, rotary brooms, water flushing equipment, and blowers, or by another approved method.
4. Cracks:
   a. Repair cracks if required per Section 32 0117.01 ‘Asphalt Paving Crack Seal’ or Section 32 0117.02 ‘Asphalt Paving Crack Fill’ prior to placing asphalt based emulsion seal. Cracks that contain weed and other live vegetation matter must be treated with Pre-Emergent Herbicide prior to crack repair.
5. Tack Coat:
   a. Follow asphalt based emulsion seal Manufacturer's recommendations for substrate preparation and application of tack coat to substrate.
      1) Roughen surface of any existing coal tar seals with wire brush.
   b. Same type of asphalt used in emulsion seal is to be used for tack coat.

3.3 APPLICATION

A. Tack Coat:
   1. Apply tack coat as per Manufacturer’s recommendations:
      a. Use one (1) part undiluted asphalt based emulsion and three (3) parts water at rate of 0.05 to 0.10 gal per sq yd.

B. Asphalt Based Emulsion Seal:
   1. Surface preparation:
      a. Do not apply asphalt based emulsion seal until completion of preparation items.
   2. Follow Seal Manufacturer's recommendations in regard to fogging of substrate, application of tack coat to substrate, application of prime coat to substrate, priming of substrate, and dilution of asphalt based emulsion seal.
   3. Apply asphalt based emulsion seal using power driven machine that continually mixes asphalt based emulsion seal, water, and sand.
   4. Apply two (2) separate asphalt based emulsion seal coats minimum in all areas. Allow first, or subsequent asphalt based emulsion seal coats to dry before applying next coat:
      a. Apply additional asphalt based emulsion seal coat:
         1) Additional asphalt based emulsion seal coat shall be applied in all or portions of the site if requested by owner.
      b. Allow individual asphalt based emulsion seal coats to dry prior to applying additional coats which can take up to twenty four (24) hours.

C. Paint Stripes:
   1. If paint stripes were removed in preparation for asphalt based emulsion seal, include following:
   2. Apply paint stripes after asphalt based emulsion seal has been applied and cured.

3.4 CLEANING

A. General:
   1. Upon completion of asphalt based emulsion seal operations, clean up and remove debris.

3.5 PROTECTION

A. Do not allow traffic on paving until asphalt based emulsion seal is thoroughly cured:
   1. Warm weather condition is approximately twenty-four (24) hours.

B. Do not allow irrigation watering for at least twenty-four (24) hours after application.

END OF SECTION

SECTION 32 1216

ASPHALT PAVING: Superpave Method

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
1. Furnish and install asphalt concrete paving in driveways and parking areas as described in Contract Documents including the following, but not limited to:
   a. Asphalt Mix Design Criteria Summary:

1)	Asphalt Binder:	PG 64-28
2)	Nominal maximum size aggregate (Nmas):	1/2 inch
3)	Maximum size aggregate:	3/4 inch
4)	Mix Designator (compaction effort); Ndesign:	50
5)	Antistrip Agent:	If required by supplier's mix design (use 1 percent or greater lime slurry when required
6)	Reclaimed Asphalt Pavement (RAP):	Allowed up to 25 percent. Asphalt binder shall be one grade softer when more than 15 percent RAP is used
7)	ROSP	Not allowed.
8)	Warm Mix Additive	If required by supplier's mix design
9)	Recycle Agent:	If required by supplier's mix design

   b. Tack coat: Application of asphaltic material to existing asphalt concrete or portland concrete surfaces before asphalt concrete pavement.
   c. Blotter materials and procedures for absorbing excess asphalt as required.

B. Related Requirements:
1. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
3. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
6. Section 01 7800: 'Closeout Submittals'.
7. Section 31 0501: Common Earthwork Requirements' for:
   a. General procedures and requirements for earthwork.
   b. Pre-installation conference held jointly with other common earthwork related sections.
8. Section 31 1123: 'Aggregate Base' for compaction of aggregate base.
9. Section 31 2213: 'Rough Grading' for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
10. Section 31 2216: 'Fine Grading' for grading of subgrade below aggregate base and topsoil.
11. Section 31 2323: 'Fill' for compaction procedures and tolerances for base.

1.2 REFERENCES

A. Association Publications:
1. Asphalt Institute, 2696 Research Park Dr., Lexington, KY www.asphaltinstitute.org:
   a. MS-2, *'Mix Design Methods'* (7th Edition 2015).

B. Definitions:
1. Aggregate: Hard inert mineral material, such as gravel, crushed rock, slag, or sand.
   a. Coarse Aggregate: Aggregate retained on or above No. 4 (4.75 mm) sieve.
   b. Coarse-Graded Aggregate: Aggregate having predominance of coarse sizes.
   c. Dense-Graded Aggregate: Aggregate that is graded from maximum size down through filler with object of obtaining an asphalt mix with controlled void content and high stability.
   d. Fine Aggregate: Aggregate passing No. 4 (4.75 mm) sieve.
   e. Fine-Graded Aggregate: Aggregate having predominance of fine sizes.
   f. Mineral Filler: Fine mineral product at least 70 percent of which passes a No. 200 (75µm) sieve.
2. Air Voids: Total volume of small air pockets between coated aggregate particles in asphalt cement concrete (ACC); expressed as percentage of bulk volume of compacted paving mixture.
3. Anti-Stripping Agent: Chemicals added to bitumen to improve the adhesion of the bitumen to hydrophilic aggregates.
4. Asphalt Binder: Asphalt cement or modified asphalt cement that binds aggregate particles into dense mass.
   a. Asphalt Cement used in paving applications that has been classified according to the Standard Specification for Performance Graded Asphalt Binder, AASHTO Designation MP 320. It can be either unmodified or modified Asphalt Cement, as long as it complies with specifications.
5. Asphalt-Aggregate Designator: Alpha-numeric code that indicates nominal maximum size of aggregate, and type and grade of asphalt in aggregate-asphalt mix.
   a. Example: “12.5 PG70-28” means aggregate asphalt mix shall be composed of aggregate gradation with 1/2 inch nominal maximum size and performance grade asphalt binder designed to perform between temperatures of 158 deg F and -18.4 deg F.
6. Equivalent Single Axle Load (ESAL): Effect on pavement performance of any combination of axle loads of varying magnitude equated to number of 18,000-lb. single-axle loads that are required to produce an equivalent effect.
7. Maximum Size (Superpave): One sieve larger than the nominal maximum size.
8. Ndesign (Superpave): Design number of gyrations used for design of Hot Mix Asphalt (HMA).
9. Nominal Maximum Size: One sieve size larger than first sieve size retaining more than 10 percent of Sample. Nominal maximum size sieve will retain minimum of 0 and maximum of 10 percent of sample. Maximum size is one sieve size larger than nominal maximum size.
10. Performance Graded Asphalt Binder (PGAB): Asphalt binder designed to produce HMA that meets certain performance standards. Designations for performance-graded asphalt binders are prefixed with PG. Each grade designation also includes two sets of numbers that denote temperature range. This is a range of climate temperatures to which road may be exposed and still be expected to give superior performance. PG numbers do not indicate viscosity as in conventional liquid asphalt designations.
11. Pre-emergent Herbicide: Chemical that is applied before weeds emerge. It acts by killing weed seedlings and /or establishing layer of chemical on or near soil surface that is toxic to germinating seeds and young seedlings.
12. Reclaimed Asphalt Pavement (RAP): Existing asphalt mixture that has been pulverized, usually by milling, and is used like aggregate in recycling of asphalt pavements.
13. Subgrade (definition varies depending upon stage of construction and context of work being performed):
   a. Prepared natural soils on which fill, aggregate base, or topsoil is placed.
   or
   b. Prepared soils immediately beneath paving.
14. Tack Coat: Very light application of liquid asphalt, or asphalt emulsion diluted with water.

C. Reference Standards:
1. American Association of State and Highway Transportation Officials:
   a. AASHTO T 304-11: ‘Standard Method of Test for Uncompacted Void Content of Fine Aggregate’.
   b. AASHTO T 322-07(2011), ‘Standard Method of Test for Determining the Creep Compliance and Strength of Hot-Mix Asphalt (HMA) Using the Indirect Tensile Test Device.
2. ASTM International:
   a. ASTM C29/C29M-16, ‘Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate'.

b. ASTM C88-13, ‘Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate'.
c. ASTM C117-13, ‘Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing'.
d. ASTM C131/C131M-14, 'Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine’.
e. ASTM C142/C142M-10, ‘Standard Test Method for Clay Lumps and Friable Particles in Aggregates'.
f. ASTM D242/D242M-09(2014), ‘Standard Specification for Mineral Filler for Bituminous Paving Mixtures'.
g. ASTM D977-13, 'Standard Specification for Emulsified Asphalt’.
h. ASTM D979/D979M-15, 'Practice for Sampling Bituminous Paving Mixtures'.
i. ASTM D2041/D2041M-11, 'Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures’.
j. ASTM D2172/D2172M-11, ‘Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures’.
k. ASTM D2256/ D2256M-10, ‘Standard Test Method for Tensile Properties of Yarns by the Single-Strand Method’.
l. ASTM D2397/D2397M, 'Standard Specification for Cationic-Emulsified Asphalt’.
m. ASTM D2419-14, ‘Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate'.
n. ASTM D2950/D2950M-14, ‘Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods'.
o. ASTM D3203/D3203M-11, ‘Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures'.
p. ASTM D3549/D3549M-11, ‘Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens’.
q. ASTM D3665-12, ‘Standard Practice for Random Sampling of Construction Materials’.
r. ASTM D4318-10, ‘Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils'.
s. ASTM D4552/D4552M-10, ‘Standard Practice for Classifying Hot-Mix Recycling Agents'.
t. ASTM D4759-11, ‘Standard Practice for Determining the Specification Conformance of Geosynthetics'.
u. ASTM D4791-10, ‘Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
v. ASTM D5444-15, ‘Standard Method for Mechanical Size Analysis of Extracted Aggregate'.
w. ASTM D5821-13, ‘Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate’.
x. ASTM D6307-10, ‘Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method'.
y. ASTM D6932/D6932M-08(2013), ‘Standard Guide for Materials and Construction of Open-Graded Friction Course Plant Mixtures’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
1. Participate in pre-installation conference as specified in Section 31 0501 ‘Common Earthwork Requirements’:
2. In addition to agenda items specified in Section 01 3100 ‘Project Management and Coordination’ and Section 31 0501 ‘Common Earthwork Requirements’, review following:
a. Review surveying and staking of parking areas and installation of sleeves.
b. Review proposed aggregate base schedule.
c. Review rough grading elevations before placing paving fill.
d. Review fine grading elevations of subgrade fine grading operations before placing aggregate base and paving.
e. Review proposed asphalt paving schedule.
f. Review asphalt paving mix design.
g. Review pre-emergent herbicide protection of adjoining property and planting area on site requirements, schedule and application requirements.

h. Review schedule of mandatory asphalt paving surface treatment to be applied after placement of asphalt paving.
i. Review schedule of paint stripes to be applied after asphalt paving surface treatment.
j. Review safety issues.
k. Review Section 01 4523 'Testing and Inspecting Services' for administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
1) Review requirements and frequency of testing and inspections.

B. Scheduling: Notify Testing Agency and Architect forty eight (48) hours minimum before placing asphalt paving.

1.4 SUBMITTALS

A. Action Submittals:
1. Product Data:
a. Pre-Emergent Herbicide:
1) Manufacturer's published product data on pre-emergent herbicide.

B. Informational Submittals:
1. Certificates:
a. Require mix plant to furnish delivery/load tickets for each batch of asphalt. Keep delivery tickets at job-site for use of Owner's Representative. Tickets shall show following:
1) Name of mix plant.
2) Date.
3) Name of contractor.
4) Name and location of Project.
5) Serial number of ticket.
6) Asphalt mix type.
7) Time loaded.
8) Identity of truck.
b. Installer to provide Manufacturer's Certificate of Compliance stating material authenticity and properties for review and acceptance by Architect before product use.
2. Design Data:
a. Hot Mix Asphalt:
1) Design Criteria:
a) Develop mix design according to current Asphalt Institute MS-2 'Asphalt Mix Design Methods' for Superpave Method.
b) Submittal format:
(1) Design mix submittal shall follow format as indicated in current Asphalt Institute MS-2*, 'Mix Design Methods.*
2) Mix design of asphalt paving must meet Design Criteria minimum requirements and show conformance to the following:
a) Location and name of hot mix asphalt concrete production facility.
b) Date of mix design. If older than two (2) years, recertify mix design.
c) Asphalt mix type.
d) Mix design method used.
e) Mix density.
f) Design air voids (three and one half (3.5) percent.
g) Asphalt content in percent.
h) Performance grade of asphalt binder.
i) Nominal maximum size of aggregate.
j) Maximum size of aggregate.
k) Aggregate source and gradation.
l) Mix properties and design parameters.
m) Temperature of mix at plant and in the field for optimum field compaction.
n) Amount of recycled asphalt pavement (RAP).
o) Mineral fillers, antistrip, and recycle agent percentages.
p) Identify if warm mix technologies will be used and how much warm mix additive will be used.

3) Within thirty (30) days prior to asphalt construction, submit actual design mix to Architect, Civil Engineering Consultant of Record and Independent Testing Laboratory for review and approval.

3. Test and Evaluation Reports:
   a. Hot Mix Asphalt:
      1) Copies of test results from tests conducted to assure compliance to Contract Document requirements.
4. Manufacturer Instructions:
   a. Pre-Emergent Herbicide:
      1) Application instructions for pre-emergent herbicide.
5. Qualification Statement:
   a. Installer:
      1) Provide Qualification documentation if requested by Owner's Representative.

C. Closeout Submittals:
   1. Include following in Operations and Maintenance Manual specified in Section 01 7800 ‘Closeout Submittals’:
      a. Record Documentation:
         1) Manufacturer’s documentation:
            a) Pre-emergent herbicide documentation.
            b) Asphalt paving design.
            c) Test reports.
            d) Certificates from mix plant of delivery/load tickets.
            e) Manufacturer’s Certificate of Compliance.
         2) Testing and Inspection Reports:
            a) Testing Agency Testing and Inspecting Reports of asphalt paving.

1.5 QUALITY ASSURANCE

A. Qualifications. Requirements of Section 01 4301 ‘Quality Assurance - Qualifications’ applies but not limited to following:
   1. Asphalt Paving:
      a. Foreman of asphalt paving crew has completed at least three (3) projects of similar size and nature.
      b. Upon request, submit documentation.
   2. Pre-emergent herbicide:
      a. Applicator:
         1) Pre-emergent herbicide shall be applied by applicator certified by State in which Project is located as an applicator of agricultural chemicals.

B. Testing and Inspection:
   1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
   2. Owner will provide Testing and Inspection for asphalt paving:
      a. Owner will employ testing agencies to perform testing and inspection for asphalt paving as specified in Field Quality Control in Part 3 of this specification.
         1) Owner’s employment of an independent Testing Agency does not relieve Contractor of Contractor’s obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
         2) See Section 01 1200: ‘Multiple Contract Summary’.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Asphalt Material:
      a. Each shipment must:
         1) Be uniform in appearance and consistency.
         2) Show no foaming when heated to specified loading temperature.

b. Do not supply shipments contaminated with other asphalt types or grades than those specified:
1) Do not use petroleum distillate as a release agent.
2. Pre-emergent herbicide:
a. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage and Handling Requirements:
1. Pre-emergent herbicide:
a. Do not freeze. Store in at temperatures above 41 deg F.
b. Follow Manufacturer's storage and handling requirements.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Pre-emergent herbicide:
a. Follow printed Manufacturer's instruction for environmental hazards:
b. Follow printed Manufacturer's instruction ambient conditions for application of product.
2. Tack Coat:
a. Apply only when air and roadbed temperatures in shade are greater than 40 deg F. Temperature restrictions may be waived only upon written authorization from Architect or Civil Engineer.
b. Do not apply to wet surfaces.
c. Do not apply when weather conditions prevent tack coat from adhering properly.
3. Asphalt paving:
a. Do not perform work during following conditions:
1) Ambient temperature is below 45 deg F or will fall below 45 deg F during placement.
2) Temperature of aggregate base below 50 deg F.
3) Cold Weather Asphalt Paving Plan: If asphalt pavement is placed outside of these temperature limits or those identified in MINIMUM Temperature Degrees, a plan is required which includes:
a) Haul times.
b) Placement details.
c) Compaction aids used in production.
d) Owner does not assume responsibility for asphalt when placed outside temperature limits.
4) Presence of free surface water or weather is unsuitable.
5) Wind or ground cools mix material before compaction.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

A. General:
1. Follow current Asphalt Institute MS-2 'Asphalt Mix Design Methods' for Superpave Method.

B. Asphalt Mix:
1. Asphalt Binder:
a. Performance Graded Asphalt Binder:
1) Use performance graded asphalt binder identified under Asphalt Mix Design Criteria.
2. Aggregates:
a. Use clean, hard, durable, angular, sound, consisting of crushed stone, crushed gravel, slag, sand, or combination.
b. Use nominal maximum size aggregate and maximum size aggregate per Asphalt Mix Design Criteria. Aggregate gradation to meet **Table 1** - **MASTER GRADING BANDS** requirements:

Table 1 - MASTER GRADING BANDS			
Sieve (mm)		Nominal Maximum Aggregate Size	
		12.5 mm	9.5 mm
Control Sieves	19	100	-
	12.5	100	100
	9.5	< 90	90 – 100
	4.75	--	< 90
	2.36	28 – 58	32 – 60
	0.075	2 – 10	2 – 10
Restricted Zone	2.36	39.1	47.2
	1.18	25.6 – 31.6	31.6 – 37.6
	0.6	19.1 – 23.1	23.5 – 27.5
	0.3	15.5	18.7

NOTES:
1. It is assumed fine and coarse aggregate have same bulk specific gravity.
2. Gradation is expressed in percent passing by weight, ASTM C136. Percentage of fines passing 0.075 mm control sieve determined by washing, ASTM C117.

c. Provide aggregate material properties to meet **Table 2 – AGGREGATE PHYSICAL PROPERTIES** requirements:

Table 2 –AGGREGATE PHYSICAL PROPERTIES

Property		ASTM	ESAL	Min	Max
Coarse Aggregate (does not pass No. 4 sieve)					
Angularity (fractured faces), percent		D5821	less than 0.3	55	--
			0.3 to 3.0	75	--
			greater than 3.0	85/80	--
Wear (hardness or toughness), percent		C131/C131M	less than 0.3	--	40
			0.3 to 3.0	--	35
			greater than 3.0	--	35
Flats or elongates (3:1 length to width), percent, maximum		D4791	--	--	20
Fine Aggregate (passing No. 4 sieve)					
Angularity (uncompacted void content), percent (AASHTO T304)		--	less than 0.3	--	--
			0.3 to 3.0	40	--
			greater than 3.0	45	--
Sand equivalent, percent		D2419	less than 0.3	40	--
			0.3 to 3.0	40	--
			greater than 3.0	45	--
Friable particles, percent		C142	--	--	2
Plastic limit, maximum	Liquid limit	D4318	--	--	25
	Plastic limit	D4318	--	--	6

Notes:
1. ESAL in millions.
2. Angularity by weight retained above 9 mm sieve, with at least one fractured face. 85/80 denotes 85 percent coarse aggregate has one fractured face and 80 percent has two or more fractured faces.
3. Wear of aggregate retained above 2.36 mm sieve unless specific aggregates have higher values are known to be satisfactory.
4. Flats or elongates retained above 4.75 mm sieve.
5. Friable particles passing No. 4.75 mm sieve.
6. Plasticity, passing No. 4.75 sieve. Aggregate is no-plastic even when filler material is added to aggregate.

Blended Physical Properties				
Dry-rodded unit weight, lb/ft^3, minimum	C29/C29M	-	75	--
Weight loss (soundness), percent, maximum	C88		--	16
Clay content or cleanliness (sand equivalent), percent	D2419	less than 0.3	45	--
		more than 0.3	60	--

Notes:
1. Weight loss using sodium sulfate.
2. Sand equivalent value is after going through dryer or before drum mixer. The sand equivalent requirement is waived for RAP aggregate but applies to remainder of aggregate blend.
3. Friable particles of clay lumps, shale, wood, mica, and coal passing 4.75 sieve.

3. Admixture:
   a. Antistrip: Heat stable, cement slurry, lime slurry, dry lime, or liquid antistrip:
      1) Add if mix is moisture sensitive as determined by 'Moisture Susceptibility' paragraph below.
   b. Mineral Filler: Comply with requirements of ASTM D242/D242M.
   c. Recycle Agent: Comply with requirements of ASTM D4552/D4552M.

2.2 MATERIAL

A. Aggregate Base: Conform to applicable requirements as specified in Section 31 1123: 'Aggregate Base'.
B. Asphalt Paving Surface Treatment:
   1. Include mandatory Asphalt Paving Surface Treatment to be applied no sooner than thirty (30) days or no later than eighteen (18) months of placing Asphalt Paving to be included with this project:

C. Pre-Emergent Herbicide:
   1. Design Criteria:
      a. Selective type pre-emergence control chemical containing forty (40) percent Trifluralin minimum for control of annual grasses and broadleaf weeds.
      b. Non-oil based sterilant.
      c. Labeled for under-pavement use.
   2. Type Two Acceptable Products:
      a. Treflan E.C. by Monterey AgResources, Fresno, CA www.montereyagresources.com (available in western United States).
      b. Trust 4EC by WinField Solutions LLC (Agrilsolutions), St Paul, MN www.agrisolutionsinfo.com (available in United States).
      c. Equal as approved by Architect before installation. See Section 01 6200.

D. Reclaimed Asphalt Pavement (RAP). Aggregate: Restrictions include:
   1. Allowed up to 25 percent. Asphalt binder shall be one grade softer when more than 15 percent RAP is used.

E. Tack Coat:
   1. Emulsified asphalt meeting requirements of ASTM D977, Grade SS-1H, CQS-1H, or ASTM D2397/D2397M, Grade CSS-1H.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Approved Applicators. See Section 01 4301 'Quality Assurance - Qualifications':

3.2 PREPARATION

A. General:
   1. Aggregate base and paving must be placed before any moisture or seasonal changes occur to subgrade that would cause compaction tests previously performed to be erroneous. Re-compact and retest subgrade soils that have been left exposed to weather.

B. Protection Of In-Place Conditions:
   1. Pre-emergent herbicide:
      a. Take necessary precautions to protect adjoining property and areas designated for planting on building site.
      b. Do not contaminate any body of water by direct application, cleaning of equipment, or disposal of wastes.
   2. Asphalt Paving:
      a. Protect all structures, including curb, gutter, sidewalks, guard rails and guide posts.
      b. Protect neighborhood, storm drains and down-stream fish habitat.

C. Surface Preparation:
   1. Survey and stake parking surfaces to show grading required by Contract Documents.
   2. Subgrade (soil below aggregate base):

a. Prepare natural soil subgrade as specified in Section 31 2213 'Rough Grading' or prepare fill subgrade as described in Section 31 2216 'Fine Grading'.

3. Aggregate base:
   a. Finish grade parking surface area to grades required by Contract Documents.
   b. Compact aggregate base as specified in Section 31 1123 'Aggregate Base'.
   c. Tolerances:
      1) Elevation of aggregate base shall be 0.00 inches high and no more than 1/2 inch low.
      2) Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
4. Tack coat:
   a. Clean surface of all materials such as mud, dirt, leaves, etc. that prevent tack from bonding to existing surfaces.
      1) If flushed, allow surface to dry.
5. Asphalt paving:
   a. Area shall be clean and tack coat applied before placing of asphalt paving.
      1) Remove all moisture, dirt, sand, leaves, and other objectionable material from prepared surface before placing asphalt.
      2) Locate, reference, and protect all utility covers, monuments, curb, and gutter and other components affected by asphalt paving operations.
      3) Allow sufficient cure time for tack coat before placing asphalt.

3.3 APPLICATION

A. Interface With Other Work:
   1. Section 31 1123: 'Aggregate Base' for compaction of aggregate base.
   2. Section 31 2213: 'Rough Grading' for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
   3. Section 31 2216: 'Fine Grading' for grading of subgrade below aggregate base and topsoil.
   4. Section 31 2323: 'Fill' for compaction procedures and tolerances.

B. Pre-Emergent Herbicide:
   1. Asphalt paving areas:
      a. Follow Manufacturer's printed application requirements:
      b. Apply to prepared subgrade dispersed in liquid. Concentrate shall be such that Manufacturer's full recommended amount of chemical will be applied to every 1000 sq ft and liquid will penetrate minimum of 2 inches.
      c. Application shall be no more than one (1) day before installation of aggregate base.

C. Tack Coat:
   1. General:
      a. Tack coat vertical surfaces or existing asphalt cement concrete or portland cement concrete that will be in contact with asphalt paving.
      b. Use tack coat diluted to a 2:1 (concentrate water) ratio.
      c. Use pressure distributor to apply in uniform, continuous spread.
      d. Cover all tacked surface areas with surfacing materials same day of application.
   2. Application rate. Typically as follows:
      a. Emulsions, 0.08 to 0.15 gallons per sq yd of diluted material:
         1) Apply sufficient to achieve ninety five (95) percent or better coverage of existing surfaces.
         2) Above application rates may vary according to field conditions. Obtain approval from Civil Engineer for quantities, rate of application, temperatures, and areas to be treated before any application.

D. Asphalt Paving:
   1. General:
      a. Paving adjacent to cast-in-place concrete site elements shall be between 1/4 inch higher than concrete.
      b. Surface texture of hand worked areas shall match texture of machine-laid areas.

c. Surface shall be uniform with no 'birdbaths'. Leave finished surfaces clean and smooth. Variations from specified grades shall not exceed 1/2 inch.
d. Cross Slope: 1/4 inch in 10 feet perpendicular to centerline except at cross section grade breaks.
e. Grade: 1/8 inch in 10 feet parallel to centerline.
f. Do not place on frozen aggregate base or during adverse climatic conditions such as precipitation or when roadway surface is icy or wet.
g. Uniformly mix materials so aggregate is thoroughly coated with asphalt.
h. Place at temperatures established by the mix design with self-propelled laydown machine.
i. Use **Table 3 – MINIMUM TEMPERATURE, DEGREES** as guide:

Table 3 – MINIMUM TEMPERATURE, DEGREES

Ambient Air Temperature Deg F.	Ambient Air Temperature Deg C.	Compacted Paving Mat Thickness					
		3/4" (19 mm)	1" (25 mm)	1 1/2" (38 mm)	2" (50 mm)	3" (75 mm)	4" + (100 mm) +
45 – 50	7 – 10	---	---	---	---	280	265
50 – 59	10 – 15	---	---	---	280	270	255
60 – 69	16 – 20	---	---	285	275	265	250
70 – 79	21 – 79	285	285	280	270	265	250
80 - 89	27 - 31	280	275	270	265	260	250
90+	32+	275	270	265	260	250	250

j. Longitudinal bituminous joints shall be vertical and properly tack coated if cold. Transverse joints shall always be tack coated.

2. Compaction:
   a. Compact asphalt paving to ninety four (94) percent plus or minus two (2) percent of theoretical maximum specific gravity, ASTM D2041/D2041M (Rice Method - maximum theoretical density).
   b. Roll with powered equipment capable of obtaining specified density while providing required smoothness.
   c. Begin breakdown rolling immediately after asphalt is placed when asphalt temperature is at maximum.
   d. Complete handwork compaction concurrently with breakdown rolling.
   e. Execute compaction so visibility of joints is minimized:
   f. Complete finish rolling to improve asphalt surface as soon as possible after intermediate rolling and while asphalt paving is still warm.
   g. Do not use vibration for finish rolling.
3. Lift Thickness:
   a. Preferred Method:
      1) For pavements 3-1/2 inch or thinner apply asphalt paving in single lift.
      2) For pavements greater than 3-1/2 inch, use alternate method below.
   b. Alternate Method:
      1) Asphalt paving may be applied in two (2) lifts, first 2 inches thick minimum and second 1 1/2 inches thick minimum following temperature recommendations of following paragraph.
      2) Surface of first lift shall be clean and provide tack coat between first and second lifts.
      3) Provide not less than two (2) times maximum aggregate size in compacted asphalt concrete mixes.

E. Asphalt Paving Surface Treatments:
1. Apply mandatory Asphalt Paving Surface Treatment no sooner than thirty (30) days or no later than eighteen (18) months of placing Asphalt Paving to be included with this project. Do not apply prior to asphalt curing (refer to 'Asphalt, Concrete and Pervious Concrete Maintenance Guidelines'):

F. Paint Stripes:
1. Apply paint stripes after asphalt paving surface treatment has been applied to asphalt paving.

3.4 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing and Inspection Services':
   a. Quality Control is sole responsibility of Contractor:
      1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
         a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
      2) Contractor bears full responsible for compliance with all contract requirements and quality control on project and will be responsible for quality of asphalt mixture and asphalt installation.

B. Field Tests (Provided by Contractor):
1. General:
   a. Contractor bears full responsibility for compliance with all contract requirements and quality control on project and will be responsible for quality of asphalt mixture and asphalt installation.
   b. Testing and Inspection Reports to be distributed as specified in Section 01 4523 'Testing And Inspection Services'.
2. Compaction Tests:
   a. Contractor to provide compaction tests of asphalt being placed to establish rolling patterns and installation procedures.
   b. Compaction tests by Contractor are independent of compaction tests being provided by Owner. See Section 01 4523 'Testing and Inspection Services'.
   c. Asphalt paving shall be compacted to ninety four (94) percent of Theoretical Maximum Specific Gravity (Rice) plus three (3) percent or minus two (2) percent. Determine percent compaction by ASTM D2041/D2041M.
3. Thickness Tests:
   a. Determine thickness of paving being placed, no less than one (1) test per 10,000 sq. ft. (930 sq. m) of paving or portion thereof, three (3) tests minimum.

C. Field Tests and Inspections (Provided by Owner):
1. General:
   a. Compaction tests provided by Owner will be used to validate or determine discrepancies with testing by Contractor.
   b. Civil engineer applies pay factor for Gradation/Asphalt Content, In-Place Density. Civil engineer computes pay factor for each lot.
   c. Opening paved surface to traffic does not constitute acceptance.
   d. Asphalt-aggregate mix sampling as per ASTM D979/D979M.
      1) Test for:
         a) Air voids as per ASTM D3203/D3203M.
         b) Asphalt binder content as per ASTM D6307.
         c) Aggregate gradation as per ASTM D5444.
   e. Lot size: 10,000 sq. ft. or part thereof.
   f. Sub lot size: 5,000 sq. ft. or part thereof.
2. At Site Testing and Inspection:
   a. General:
      1) Sampling: One (1) random sample per sample per 10,000 sq. ft.: Locations as follows:
         a) Behind paver before compaction.
            or
         b) Where sub-lot exhibits non-uniform appearance.
   b. Asphalt Paving:
      1) Testing Agency shall provide full time nuclear density testing and inspection for asphalt paving during asphalt paving operations (nuclear density testing is informational testing only and does not constitute acceptance by Owner).
      2) Inspection to include:
         a) Aggregate coating.
         b) Compaction control and effort required.

c) Suitability of spreading and asphalt paving equipment.
d) Temperature of mix as delivered and placed.
(1) Reject mixes exceeding 325 deg F in transport vehicle as required in Non-Conforming Work below.
(2) Dispose of cold mix in paver hopper as thin spread underlay.

3) Field Tests:
a) When tested with 10 foot straight edge, surface of completed work shall not contain irregularities in excess of 1/4 inch.
b) Determine percent compaction per ASTM D2950/D2950M unless other nondestructive nonnuclear methods such as sonar are used.
c) Provide written nuclear density testing, or other nondestructive nonnuclear methods such as sonar, of asphalt paving at minimum rate of one (1) per 2,500 sq. ft. Select test locations by ASTM D3665 and sample per ASTM D979/D979M before compaction. Minimum of three (3) tests required.
d) Compact asphalt paving to ninety four (94) percent of Theoretical Maximum Specific Gravity (Rice) plus three (3) percent or minus two (2) percent.
e) Maximum average total air voids in completed hot mix asphalt shall be eight (8) percent but more than three (3) percent as determined by ASTM D2041/D2041M.
f) Determine thickness of paving being placed, no less than one (1) test per 10,000 sq. ft. of paving or portion thereof, three (3) tests minimum.

3. At Laboratory Testing:
a. General:
1) Provide at least one (1) laboratory test series for every 10,000 sq. ft. or part thereof (minimum of one (1) test):
a) Test reports will show compliance with Contract Documents regarding type and depth of aggregate base, depth and density of asphalt paving, asphalt content, aggregate gradation, flow and stability, bulk specific gravity and maximum specific gravity.
b) Reports will also give test procedures used by testing laboratory.

b. Compaction and Final Density:
1) Pavement thickness and final density to be determined by results of coring. Provide one (1) core per 10,000 sq. ft. or part thereof. Minimum of three (3) tests required if under 30,000 sq. ft.
a) Based upon core samples, compaction is acceptable if test deviations are within pay factor 1.00 limits.
b) At Project Manager's discretion, after consulting with Design Team, a Lot with a sub-lot test deviation greater than Reject may stay in place at fifty (50) percent cost.
c) Select test locations by ASTM D3665 and sample per ASTM D979/D979M after compaction.

c. Compaction Pay Factor:
1) Based upon core samples, compaction is acceptable if test deviations are within pay factor 1.00 limits.
2) At Project Manager's discretion, after consulting with design team, a Lot with a sub-lot test deviation greater than Reject may stay in place at fifty (50) percent cost.
3) Average Density, in percent as shown in **Table 4 – COMPACTION PAY FACTORS**:

Table 4 – COMPACTION PAY FACTORS (94 percent of theoretical maximum specific gravity – Superpave (Rice) (ASTM D2041/D2041M plus three (3) or minus two (2) percent)		
Pay Factor	Density, in Percent	
	Average	Lowest Test
0.70	More than 96	---
1.00	92 to 96	89 or Greater
0.90	92 to 96	Less than 89
Reject	Less than 92	---
Notes: 1. At Contractor's discretion and expense, do Hamburg wheel track test (AASHTO T 304) on 3 additional random core samples from non-complying sub-lot of 5,000 sq. ft. (465 sq. m). Sub-lot will be accepted if average rut depth is less than 10 mm at 20,000 passes.		

d. Pavement Thickness:
   1) Pavement thickness and final density to be determined by results of coring. Provide one (1) core per 10,000 sq. ft. or part thereof. Minimum of three (3) tests required if under 30,000 sq. ft.
      a) Acceptance will be based on the average of all thickness tests.
      b) At Project Manager's discretion, after consulting with design team, payment may be made for areas deficient in thickness by more than 0.75 inches at fifty (50) percent. If not, remove and replace at no additional cost to the Owner as shown in **Table 5 – THICKNESS PAY FACTORS**:

Table 5 – THICKNESS PAY FACTORS	
Pay Factors	Thickness Deficiency, in Inches (ASTM D3549/D3549M)
1.00	0.00 to 0.25
0.90	0.26 to 0.50
0.70	0.51 to 0.75
Reject	0.76 to 1.00

e. Air Voids:
   1) Basis of evaluation is laboratory compacted samples (not field compacted samples).
   2) Air voids will be mix design target plus or minus one (1) percent.
   3) If test results are not within this Section's limits, options include correction of production procedures or alternate mix design acceptable to Civil Engineer.

D. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Asphalt Paving:
      a. Deficient asphalt paving thickness:
         1) Place additional material over deficient areas. Do not skin patch. Mill for inlay if necessary. Correct deficient asphalt paving thickness at no additional cost to the Owner.
      b. Rejection and Removal of Asphalt Paving:
         1) Remove asphalt paving found defective after installation and install acceptable product at no additional cost to the Owner.
      c. Removal of Asphalt Paving:
         1) Remove spatter, over-coat, or mar at no additional cost to the Owner.
         2) Remove asphalt from borrow pits or gutters at no additional cost to the Owner.
      d. Repair of Asphalt Paving:

1) Repair or replace defective joints, seams, edges at no additional cost to the Owner.

3.5 PROTECTION

A. Tack Coat:
   1. Protect all surfaces exposed to public view from being spattered or marred. Remove any spattering, over-coating, or marring at no additional cost to Owner.
   2. Traffic:
      a. Do not permit traffic to travel over tacked surface until tack coat has cured and dried.

B. Asphalt Paving:
   1. Protect hot mixed asphalt (HMA) pavement from traffic until mixture has cooled enough not to become marked.

3.6 CLEANING

A. Waste Management:
   1. Pre-emergent herbicide:
      a. Follow Manufacturer's recommendations for disposal of product at approved waste disposal facility.
         1) Do not reuse empty containers.

END OF SECTION

SECTION 32 1723

PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
   1. Furnish acrylic paint and apply pavement and curb markings as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:
   1. Federal Specifications and Standards:
      a. FED-STD-595C, 'Federal Standard: Colors Used in Government Procurement' (16 Jan 2008).
      b. FED TT-P-1952F, 'Paint, Traffic and Airfield Marking, Waterborne' (17 Feb 2015).
   2. U.S. Department of Transportation Federal Highway Administration:

1.3 SUBMITTALLS

A. Action Submittal:
   1. Product Data:
      1) Manufacturer's published product data and certification that product supplied meets requirements of this specification.

B. Informational Submittal:
   1. Test and Evaluation Reports:
      a. Acrylic Paint:
         1) Provide reports showing compliance to FED TT-P-1952F.

C. Closeout Submittals:
   1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Manufacturer's Documentation:
            a) Product data.
            b) Specification compliance documentation.
         2) Testing and Inspection Reports:
            a) Reports showing compliance.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Paint must meet requirements of FED TT-P-1952-F and local regulations for VOC.
   2. Paint handicap spaces to conform to ADA Standards and local code requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Materials shall be delivered in original, unopened containers with labels intact.
    a. Labels to include:
        1) Manufacturer's name and address.
        2) TT-P-1952F reference.
        3) Classification Type.
        4) Color.

B. Storage and Handling Requirements:
    1. Follow Manufacturer's storage and handling requirements.
    2. Protect stored material from freezing at temperatures above 35 deg F or above 115 deg F.
    3. Do not invert or roll containers.

1.6 FIELD CONDITIONS

A. Ambient Conditions:
    1. Acrylic Paint:
        a. Apply only on dry clean surfaces, during favorable weather (not excessively windy, dusty, or foggy), and when damage by rain, fog, or condensation not anticipated.
        b. Paving surface and Ambient temperature shall be minimum 50 deg F and rising.
        c. Temperature shall not drop below 50 deg F within twenty four (24) hour period following application.
        d. Acetone based paints that are one hundred (100) percent acrylic shall not drop below 32 deg F within twenty four (24) hour period following application.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Acrylic Paint:
    1. Description:
        a. Low VOC, ready-mixed, one- component, acrylic waterborne traffic marking paint suitable for application on concrete, asphalt, sealers, and previously painted areas of these surfaces.
    2. Design Criteria:
        a. General:
            1) Traffic Paint.
            2) Non-volatile portion of vehicle for all classification types shall be composed of one hundred (100) percent acrylic.
            3) Meet FED TT-P-1952F specification requirements.
            4) Fast drying when applied at ambient conditions requirement.
            5) Low VOC.
            6) Non-Reflectorized.
            7) Traffic paints not intended for use as floor paints. Do not use on pedestrian walkways or large surfaces such as ramps, floors and stairs which may become slippery when wet.
        b. Classification:
            1) Type I for use under normal conditions.
        c. Composition:
            1) Non-volatile portion for all types shall be composed of one hundred (100) percent acrylic polymer as determined by infrared spectral analysis.
            2) Prohibited material:
                a) Product does not contain mercury, lead, hexavalent chromium, toluene, chlorinated solvents, hydrolysable chlorine derivatives, ethylene-based glycol ethers and their acetates, nor any carcinogen.
        d. Qualitative Requirements:
            1) Meet FED TT-P-1952F requirements for:
                a) Abrasion resistance.

b) Accelerated package stability.
c) Accelerated weathering.
d) Appearance.
e) Color requirements:
(1) Color Match (all colors except white and yellow).
(2) Daylight directional reflectance.
(3) Yellow color match.
f) Condition in container.
g) Dry-through (early washout) for Type II only.
h) Flexibility.
i) Freeze/thaw stability.
j) Heat-shear stability.
k) Scrub resistance.
l) Skinning.
m) Titanium dioxide content.
n) Water resistance.

e. Quantitative requirements:
1) Meet FED TT-P-1952F requirements (Table 1).
2) Acetone based paints that are one hundred (100) percent acrylic and have exempt status under Federal law are exempt from meeting FED TT-P-1925F requirements.

3. Colors:
a. General:
1) Traffic Paint will be furnished in white and any Federal Standard 595 color in accordance to FED-STD-595C:
a) Yellow: 33538.
b) Blue: 35180.
c) Red: 31136.
b. White (Yellow may be used at Owner Representative's discretion):
1) Lane lines, edge lines, transverse lines, arrows, words, symbol markings, speed bump markings, parking space markings.
c. Yellow:
1) Cross-hatching in medians, cross hatching in safety zones separating opposing traffic flows, crosswalk stripes, safety markings, centerlines, edge lines along left edge of one-way roadway or one way ramp.
d. Blue And White:
1) In parking spaces specifically designated as reserved for disabled.
e. Red:
1) Fire lanes, no parking zones, special raised pavement markers that are placed to be visible to "wrong-way" drivers.

4. Type Two Acceptable Products:
a. Any product meeting design criteria of this specification as approved by Architect/Owner's Representative before application. See Section 01 6200.

PART 3 - EXECUTION

3.1 PREPARATION

A. Acrylic Paint:
1. Asphalt Surfaces:
a. Do not apply paint until asphalt has cooled.
b. Allow new seal coated surfaces to cure for at least twenty four (24) hours before applying paint.
2. Concrete Surfaces:
a. Do not apply paint to new concrete surfaces until concrete has cured seven (7) days minimum.

B. Surfaces shall be dry and free of grease and loose dirt particles.

C. Perform layout with chalk or lumber crayon only.

3.2 APPLICATION

A. General:
   1. Mix in accordance and apply as per Manufacturer's instructions.
   2. Apply at locations and to dimensions and spacing as shown on Contract Drawings.

B. Tolerances:
   1. General: Make lines parallel, evenly spaced, and with sharply defined edges.
   2. Line Widths:
      a. Plus or minus 1/4 inch variance on straight segments.
      b. Plus or minus 1/2 inch variance on curved alignments.

C. Coverage:
   1. Paint stripes added to new asphalt and concrete surfaces:
      a. Apply single coat.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work:
   1. Replace or correct defective material not conforming to requirements of this specification or any work performed that is of inferior quality at no cost to Owner.

3.4 CLEANING

A. General:
   1. Remove drips, overspray, improper markings, and paint material tracked by traffic by sand blasting, wire brushing, or other method approved by Architect/Owner’s Representative before performance.

B. Waste Management:
   1. Remove debris resulting from work of this Section. Dispose of or recycle all trash and excess material in manner conforming to current EPA regulations and local laws.

END OF SECTION

SECTION 32 3113

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install complete fence and gates as described in Contract Documents.

B. Related Requirements:
   1. Section 03 3111: 'Cast-In-Place Structural Concrete' for mow strips at fencing and setting sleeves in concrete retaining walls.
   2. Section 05 0503: 'Shop-Applied Metal Coatings' for priming and galvanizing repair.
   3. Section 05 0523: 'Metal Fastening' for welding requirements.

1.2 REFERENCES

A. Association Publications: / Organizations:
   1. Chain Link Fence Manufacturers Institute (CLFMI), Columbia, MD www.chainlinkinfo.org.
      a. WLG 2445, *'Chain Link Fence Wind Load Guide for the Selection of Line Post and Line Post Spacing*' (2012).
      b. CLF-SFR0111, *'Chain Link Fence Manufacturers Institute Security Fencing Recommendations'*.
      c. CLF-PM0610, *'Field Inspection Guide'*.
      d. CLF-TP0211, *'Tested and Proven Performance of Security Grade Chain Link Fencing Systems'*.

B. Reference Standards:
   1. ASTM International:
      a. ASTM A123/A123M-17, 'Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products'.
      b. ASTM A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
      c. ASTM A392-11a(2017), 'Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric'.'
      d. ASTM A1011/A1011M-18a, 'Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength'.
      e. ASTM C1107/C1107M-17, 'Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)'.
      f. ASTM F1043-18, 'Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework'.
      g. ASTM F1083-18, 'Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures'.
      h. ASTM F3000/F3000M-13(2018), 'Standard Specification for Polymer Privacy Insert Slats for Chain Link Fabric and Privacy Chain Link Fabric Manufactured Containing Pre-Installed Privacy Slats'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data: Manufacturer literature or cut sheets on fence components.

2. Samples: Types of vision slats and colors for Architect's selection.

B. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Warranty Documentation:
1) Vision Slats:
a) Final, executed copy of Warranty.

1.4 WARRANTY

A. Vision Slats:
1. Manufacturers twenty-five (25) year, pro-rata limited Warranty.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Materials:
1. Fabric:
a. Chain Link Fabric of 9 ga (3.7 mm) wire, galvanized before or after weaving with 1.2 ounce (34 grams) zinc coating conforming to requirements of ASTM A392, Class I.
b. Mesh:
1) With Visual Privacy / Security Slats:
a) 2 inch (50 mm) square mesh required by specified vision slat.
c. Knuckle both selvages.
2. Framework:
a. Posts and Rails shall be roll-formed, self-draining shapes meeting strength requirements of ASTM F1043, Table 3, and with 2 ounce (56.7 grams) zinc coating per 1 sq ft (0.0929 sq meter) of surface area conforming to ASTM A123/A123M.
b. Line Posts:
1) Line Posts 8 feet (2.45 m) and under:
a) 1.875 by 1.625 inch (48 by 41 mm) C-section roll formed from steel conforming to ASTM A1011/A1011M, Grade 45, with minimum theoretical bending strength of 247 lbs (112 kg) under 6 foot (1.80 m) cantilever load.
b) 2.375 inch (60 mm) outside diameter Schedule 40 tubular section weighing 3.65 lbs (1.6 kg) per lineal 1 ft (305 mm) meeting requirements of ASTM F1083.
c) 2.375 inch (60 mm) outside diameter Schedule 40 tubular section weighing 3.12 lbs (1.42 kg) per lineal 1 ft (305 mm) formed from steel meeting requirements of ASTM A1011/A1011M.
c. Terminal And Gate Posts:
1) Gate Posts and gate posts for gate leaves under 6 feet (1.80 m) wide:
a) 3.5 by 3.5 inch (89 by 89 mm) roll formed section with minimum theoretical bending strength of 486 pounds (220.5 kg) under 6 foot (1.80 m) cantilever load.
b) 3 inch (76 mm) outside diameter Schedule 40 pipe weighing 5.79 lbs (2.63 kg) per lineal 1 ft (305 mm) meeting requirements of ASTM F1083.
c) 3 inch (76 mm) outside diameter Schedule 40 tubular section weighing 4.64 lbs (2.11 kg) per lineal 1 ft (305 mm) formed from steel meeting requirements of ASTM A1011/A1011M.

d. Top And Brace Rail:
1) 1.625 by 1.25 inch (41 by 32 mm) roll formed section of 45,000 psi (310 MPa) yield strength channel shaped rail with minimum theoretical bending strength of 247 lbs (112 kg) on 10 foot (3.050 m) midpoint load.
2) 1.660 inch 42 mm outside diameter Schedule 40 pipe weighing 2.27 lbs (1.03 kg) per lineal 1 ft (305 mm) meeting requirements of ASTM F1083.

3) 1.660 inch 42 mm outside diameter Schedule 40 tubular section weighing 1.84 lbs (0.83 kg) per lineal 1 ft (305 mm) formed from steel meeting requirements of ASTM A1011/A1011M.

e. Fittings:
1) Pressed steel or malleable iron, hot-dip galvanized conforming to ASTM A153/A153M.
2) Tie wires shall be 12 ga (2.05 mm) minimum galvanized steel or 9 ga (3 mm) minimum aluminum wire.

f. Tension Wire: 7 ga (3.66 mm) minimum galvanized spring steel.

3. Gate Leafs Wider Than 6 Feet (1.80 Meters):
a. Fabricate perimeter frames from metal and finish to match fence framework. Assemble frames by welding or with special fittings and rivets, for rigid connections, providing security against removal or breakage connections.
1) Provide same fabric as for fence. Install fabric with stretcher bars at vertical edges and at top and bottom edges. Attach stretchers bars to frame at not more than 15 inches (380 mm) on center.
2) Install diagonal cross-bracing consisting of 3/8 inch (9.5 mm) diameter adjustable length truss rods to ensure frame rigidity without sag or twist.

b. Swing Gates: Fabricate perimeter frames of minimum 1.90 inches (48.26 mm) OD pipe.

c. Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASTM A153/A153M, and in accordance with following:
1) Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180 degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6 foot (1.80 m) nominal height.
2) Latch At Paving: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

d. Keeper: Provide keeper for vehicle gates, which automatically engages gate leaf and holds it in open position until manually released.

e. Double Gates:
1) Provide gate stops for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar.
2) Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.

f. Sliding Gates: Provide Manufacturer's standard heavy-duty inverted channel track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, hardware, and accessories as required.

B. Mixes:
1. Post Foundation Concrete:
a. One cu ft cement, 2 cu ft (0.0566 cu m) sand, 4 cu ft (0.1132 cu m) gravel, and 5 gallons (18.93 liters) minimum to 6 gallons (22.71 liters) maximum water.
b. Mix thoroughly before placing.

2.2 ACCESSORIES

A. Post Setting Grout at Sleeves:
1. Commercial nonshrink grout conforming to requirements of ASTM C1107/C1107M, Type B or C.
2. Type Two Approved Products:
a. Normal Construction Grout A by W R Bonsal, Charlotte, NC www.bonsal.com.
b. Advantage 1107 Grout by Dayton Superior, Miamisburg, OH www.daytonrichmond.com.
c. NS Grout by Euclid Chemical Co, Cleveland, OH www.euclidchemical.com.
d. 5 Star Special Grout 110 by Five Star Products Inc, Fairfield, CT www.fivestarproducts.com.
e. Duragrout by L&M Construction Chemicals Inc, Omaha, NE www.lmcc.com.
f. Masterflow 713 Pre-mixed Grout by Master Builders, Cleveland, OH www.masterbuilders.com.
g. Tamms Grout 621 by TAMMS Industries, Mentor, OH www.tamms.com.
h. U S Spec MP Grout by U S Mix Products Co www.usspec.com.
i. CG-86 Grout by W R Meadows, Elgin, IL www.wrmeadows.com.
j. Equal as approved by Architect before use. See Section 01 6200.

B. Vision Slats And Fabric:
   1. Manufacturer Contact List:
      a. *Privacy*Link, Hyde Park, UT www.eprivacylink.com.
   2. Description:
      a. High-density polyethylene (HDPE), double-walled, self-locking or with locking feature that prevents slats from being removed
      b. Slats pre-woven and pre-inserted into chain link fabric.
   3. Design Criteria:
      a. Meet ASTM F3000/F3000M requirements for pre-installed privacy slats.
      b. Provide slats with ultra violet (UV) inhibitors.
   4. Visual Privacy / Security:
      a. Semi Privacy:
         1) Description:
            a) When installed, slats will provide 75 percent minimum visual privacy/security.
            b) Mesh: 2 inch x 2 inch (50 mm x 50 mm).
         2) Pre-inserted slats:
            a) Flexible round tubes to lock double-wall slats securely in place at both top and bottom of fence by flexible round tubes.
         3) Type Two Acceptable Product:
            a) Noodle Link by *Privacy*Link.
            b) Equal as approved by Architect before installation. See Section 01 6200.
   5. Color:
      a. Slats:
         1) As selected by Architect from Manufacturer's standard colors.
      b. Flexible round tubes:
         1) Galvanized Grey.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fence shall be installed by mechanics skilled and experienced in erecting fences of this type and in accordance with Contract Documents.
   1. When general ground contour is to be followed, make changes of grade in gradual, rolling manner.
   2. Evenly space posts in line of fence a maximum of 10 feet (3.050 meter) center to center.

B. Post Foundations:
   1. Except atop retaining walls, set posts with concrete post foundations as specified below:
      a. Line Posts:
         1) Diameter 8 inch (200 mm)
         2) Depth 36 inch (915 mm).
      b. Gate, End, And Corner Posts:
         1) Diameter 12 inch (305 mm)
         2) Depth 42 inch (1 065 mm).
      c. At mow strips, set top of post foundation below grade sufficient to allow for placing of mow strip. Measure post foundation depth from top of mow strip.
      d. Where fences are incorporated into slabs, measure post foundation depth from top of slab. Extend bottom of slab footing sufficient to allow specified amount of concrete around post. At existing slabs, install fence outside perimeter of slab.
      e. For fences on retaining walls, provide 12 inch (305 mm) long sleeves to be cast into retaining wall. Set pipe in sleeve and grout space between sleeve and post full.

C. Fence:
   1. After posts have been permanently positioned and concrete cured for one (1) week minimum, install framework, braces, and top rail. Join top rail with 6 inch (150 mm) minimum couplings at not more than 21 foot (6.40 meter) centers.

2. Stretch fabric by attaching one end to terminal post and supplying sufficient tension to other end of stretch so slack is removed.
   a. Fasten fabric to line posts with tie wires. Pass ties over one strand of fabric and hook under line post flange.
   b. Place one tie as close to bottom of fabric as is possible with additional ties equally spaced between top and bottom band on approximately equal spacing not to exceed 14 inches (355 mm) on center.
   c. Attach fabric to roll formed terminals by weaving fabric into integral lock loops formed in post. Attach fabric to tubular terminals with tension bars and bands.
   d. Hold fabric approximately 2 inches (50 mm) above finish grade line.
   e. On top rail, space tie wires at no more than 24 inches (610 mm) on center.
   f. Securely attach fittings and firmly tighten nuts.

3.2 CLEANING

A. Spread dirt from foundation excavations evenly around surrounding area unless otherwise directed. Leave area free of excess dribbles of concrete, pieces of wire, and other scrap materials.

END OF SECTION

SECTION 32 9120

TOPSOIL AND PLACEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
   1. Perform topsoil evaluation and placement required prior to topsoil grading as described in Contract Documents.

B. Related Requirements:
   1. Section 31 0501: 'Common Earthwork Requirements':
   2. Section 31 1413: 'Topsoil Stripping and Stockpiling' for stripping and storing of existing topsoil.
   3. Section 31 2216: ‘Fine Grading’ for landscaping and planting areas.
   4. Section 32 9001: 'Common Planting Requirements':
      a. Pre-installation conference held jointly with other common planting related sections.
   5. Section 32 9121: ‘Topsoil Physical Preparation’ for physical preparation of topsoil (section included based on Topsoil Testing Report).
   6. Section 32 9122: ‘Topsoil Grading’ for preparation of topsoil and addition of amendments prior to landscaping.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM D1557-12, ‘Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3)’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 32 9001.
   2. In addition to agenda items specified in Section 01 3100 and Section 32 9001, review following:
      a. Review finish grade elevation and tolerance requirements.
      b. Review surface preparation requirements including disking, tilling, ripping, or aerating.
      c. Review Attachment 'Topsoil Testing Report' including:
         1) Landscape Architect, Contractor, Testing, and Soil Testing Laboratory Instructions.
      d. Review Field Quality Control testing requirements for 'Topsoil Testing Report' including:
         1) Corrections required for topsoil not meeting requirements of this specification.
         2) Approval requirement of ‘Topsoil Testing Report’ by Landscape Architect.
         3) Submittals required as identified in Closeout Submittals.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Testing And Evaluation Reports:
      a. Use ‘Topsoil Testing Report’ attachment to this specification for Topsoil Testing as specified in 'Field Quality Control' in Part 3 of this specification for imported and site topsoil and account of recent use:
         1) Owner will pay for one (1) final test.

2) Additional test(s) if necessary will be paid by Contractor.
3) Submit two (2) copies of Final 'Topsoil Testing Report' approved by Landscape Architect to be included with Closeout Submittals.

2. Field Quality Control Submittals:
   a. Submit report stating location of source of imported topsoil and account of recent use.
   b. Submit delivery slips indicating amount of physical amendments delivered to Project site.

B. Closeout Submittals:
1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
   a. Record Documentation:
      1) Submit one (1) copy Final approved 'Topsoil Testing Report'.
      2) Provide report stating location of source of imported topsoil and account of recent use.
   b. Landscape Management Plan (LMP):
      1) Landscape Section:
         a) Submit one (1) copy in LMP Landscape Section Final approved 'Topsoil Testing Report'.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil:
1. Design Criteria:
   a. Topsoil used in landscaped areas, whether imported, stockpiled, or in place, shall be weed free, fertile, loose, friable soil meeting following criteria:
      1) Chemical Characteristics:
         a) pH 5.5 to 8.0.
         b) Soluble Salts: less than 3.0 mmhos/cm.
         c) Sodium Absorption Ratio (SAR): less than 6.0.
         d) Organic Matter: greater than one percent.
      2) Physical Characteristics:
         a) Gradation as defined by USDA triangle of physical characteristics as measured by hydrometer.
            (1) Sand: 15 to 60 percent.
            (2) Silt: 10 to 60 percent.
            (3) Clay: 5 to 30 percent.
         b) Clean and free from toxic minerals and chemicals, noxious weeds, rocks larger than or equal to 1-1/2 inch in any dimension, and other objectionable materials.
         c) Soil (Coordinate screening as specified in Section 31 1413 'Topsoil Stripping and Stockpiling' to meet these characteristics):
            (1) Soil shall not contain more than five (5) percent by volume of rocks measuring over 1/4 inch in largest size.
            (2) Soil shall be topsoil in nature.
            (3) Soil resembling road base or other like materials are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Do not commence work of this Section until grading tolerances specified in Section 31 2216 are met.

2. Do not commence work of this Section until coordination with Section 32 9121 'Physical Preparation' and Section 32 9122 ‘Topsoil Grading’ and if required by these specifications prior to placement.
3. Receive approval from Landscape Architect of subgrade elevations prior to commencement of this Work.

3.2 PREPARATION

A. Protection Of In-Place Conditions:
   1. Protect utilities and site elements from damage.

B. Surface Preparation:
   1. Surfaces to receive Imported and Stockpiled Topsoil:
      a. Disk, till, rip, or aerate with approved agricultural aerator to depth of 6 inches
      b. Place specified and approved topsoil on prepared surface.

3.3 PERFORMANCE

A. General:
   1. After Surface Preparation requirements are completed, limit use of heavy equipment to areas no closer than 6 feet from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet.
   2. Do not expose or damage existing shrub or tree roots.

B. Topsoil Depth/Quantity:
   1. Total topsoil depth of 12 inches minimum in lawn and 18 inches minimum in shrub/tree planting areas.
   2. Provide no less than quantity required to achieve tolerance described in Section 32 9122 'Topsoil Grading' along with additional physical soil amendments required in Section 32 9121 'Topsoil Physical Preparation'. Installer of this section responsible for providing sufficient topsoil material.

C. Imported Topsoil:
   1. Place tested and approved topsoil:
      a. Before placing topsoil, remove organic material, rocks and clods greater than 1-1/2 inch in any dimension, and other objectionable materials.
      b. Do not place topsoil whose moisture content makes it prone to compaction during placement process.
      c. Do not place topsoil when subgrade is either wet or frozen enough to cause clodding.

D. In Place Topsoil:
   1. At locations where topsoil can remain in place and has been tested and approved, perform the following:
      a. Remove existing vegetation as required in preparation for new landscaping.
      b. Remove vegetative layer, roots, organic material, rocks and clods greater than 1-1/2 inch in any dimension, and other objectionable materials.

E. Grading:
   1. Slope grade away from building for 12 feet minimum from walls at slope of 1/2 inch in 12 inches minimum unless otherwise noted.
      a. High point of finish grade at building foundation shall be 6 inches minimum below finish floor level.
      b. Direct surface drainage in manner indicated on Contract Documents by molding surface to facilitate natural run-off of water.
      c. Fill low spots and pockets with topsoil and grade to drain properly.

3.4 FIELD QUALITY CONTROL

A. Testing And Inspections:
   1. Topsoil Testing:
      a. Test topsoil for project suitability using Owner supplied 'Topsoil Testing Report,' attachment to this specification:
         1) Testing requirements:
            a) If testing report shows topsoil does not meet topsoil Design Criteria and 'Topsoil Testing Report: Soil Test Data' requirements, topsoil is non-conforming. Corrections and re-testing are required until topsoil meets requirements.
            b) Use new 'Topsoil Testing Report', each time topsoil is tested.
            c) After topsoil testing is approved by Landscape Architect, submit two (2) copies of Final 'Topsoil Testing Report as specified in Part 1 'Submittals' of this specification.

B. Non-Conforming Work:
   1. If topsoil does not meet topsoil Design Criteria and 'Topsoil Testing Report: Soil Test Data' requirements topsoil will be re-tested at no cost to Owner.
      a. Correction procedures:
         1) Topsoil not meeting specified physical characteristics of sand, silt, and clay shall be removed from site.
         2) Topsoil not meeting specified organic or fertility specifications may be amended in place with materials recommended in Topsoil Testing Report.
         3) If amendments are necessary, submit proposed amendments and application rates required to bring topsoil up to minimum specified requirements.
         4) Re-test topsoil and remove and amend as required until it meets minimum specified requirements.
      b. Submit report to Landscape Architect for approval.
      c. Receive approval from Landscape Architect prior to planting.

END OF SECTION

ATTACHMENTS

Topsoil Testing Report

Project	Name		Property Number
	Site Street Address, City, State/Province		
Person Submitting Test	Name	Date Requested	Phone
	Address, City, State/Province		Fax
Soil Testing Laboratory	Name	Date Submitted	Phone
	Address, City, State/Province		Fax

General

1. Owner will pay for pre-bid testing and one (1) final topsoil test.

Landscape Architect Instructions

1. Landscape Architect shall determine by investigation quality and quantity of topsoil on site before landscape design. Add physical and fertility recommendations from laboratory recommendations to relevant Church specifications.

Contractor Instructions

1. Test installed topsoil. Installed topsoil shall comply with Project Specifications.
2. If installed topsoil does not comply, Contractor will enhance and test at no cost to Owner until installed topsoil complies with Project Specifications.

Testing Instructions

1. Collect at least two (2) samples of on-site topsoil and each anticipated topsoil source. If site soil profile or borrow pit are not uniform, additional samples shall be taken. Uniform composite samples may also be used if properly acquired and documented.
2. Submit required soil samples to soil testing laboratory along with all required (for this report and laboratory) information.

Soil Testing Laboratory Instructions

1. This report must be completely filled out and provide soil interpretation and amendment, fertilizer, and soil conditioner recommendations for use by Landscape Architect. These recommendations should consider lawn areas, tree and shrub areas, and native plant areas.
2. Provide appropriate times for fertilizing.
3. Return completed Topsoil Testing Report to person submitting the test.

SOIL SAMPLE LOG		
Soil Sample No.	Description of location where sample was taken	History of use of the soil

Existing Conditions Test Report

("Acceptable Levels" refers to the allowable soil specifications prior to being amended)

SOIL TEST DATA												
Sample No.	pH(1)	EC[1] Mmhos/cm	SAR[1]	% Sand	% Silt	% Clay	Text[2] Class	%[3] OM	NO3-N[4] ppm	P[5] ppm	K[5] ppm	Fe[5] Ppm
Acceptable Level(s)	5.5 - 8.4	<3.0	<6.0	15-60	10-60	5-30	(2)	>1.0	>20	>11	>130	>10

[1] Saturated soil paste 1:1 soil:water method (please Indicate)

[2] Hydrometer method (Acceptable soil- sand:15-60 percent, silt:10-60 percent, clay-5-30 percent)

[3] Potassium dichromate method (Walkey-Black) or loss of ignition

[4] Chromotropic acid method

[5] AB-DTPA method

If other methods are used for NO3-N, P, K, and Fe, then note.

ROCKS (Coarse Fragments)		
Sample No.	Percent > 1/4 inch (6.4 mm)	Rocks Present ≥ 1.5 inch (38 mm) Indicate as present or not present
	percent	
	percent	
Acceptable Level	≤ 5.0 percent	< 1.5 inch (38 mm)

Landscape Area Description

Lawn Areas: Receive 12 inch (125 mm) topsoil plus recommended amendments and fertilizers.

Shrub/Tree Areas: Receive 18 inch (125 mm) topsoil plus recommended amendments and fertilizers.

INFILTRATION RATE	
Documented Infiltration rate of test sample(s) based on texture at 90 percent relative density (to nearest 1/10th of an inch)	
Sample No.	Rate
	Inches/Hour
	Inches/Hour

Interpretation Summary of Test Results:

Soil Amendments, Fertilizer and Soil Conditioner – Recommendations:

Lawn Areas

Shrub/Tree Areas

Native Grass/Shrub/Tree Areas

Long Term (5 Year) Fertilizer and Soil Conditioner – Recommendations:

Lawn Areas

Shrub/Tree Areas

Native Grass/Shrub/Tree Areas

SECTION 32 9121

TOPSOIL PHYSICAL PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
   1. Perform soil preparation work as described in Contract Documents.

B. Related Requirements:
   1. Section 31 0501: 'Common Earthwork Requirements' for common site construction requirements.
      a. General procedures and requirements for earthwork.
   2. Section 31 1413: ‘Topsoil Stripping And Stockpiling’.
   3. Section 31 2213: ‘Rough Grading’.
   4. Section 32 9001: 'Common Planting Requirements':
      a. Pre-installation conference held jointly with other common planting related sections.
   5. Section 32 9120: ‘Topsoil And Placement’ for topsoil evaluation and placement required for topsoil grading.
   6. Section 32 9122: ‘Topsoil Grading’ for preparation of topsoil and addition of amendments prior to landscaping.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 32 9001.
   2. In addition to agenda items specified in Section 01 3100, review the following:
      a. Review physical soil amendments.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Physical Soil Amendments:
   1. Incorporate following soil amendments if required by Topsoil Testing Report analysis into topsoil used for Project:
      a. Sand: 15 to 60 percent recommended.
      b. Silt: 10 to 60 percent recommended:
      c. Clay: 5 to 30 percent recommended:

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Physical Soil Amendments:
   1. Add specified soil amendments at specified rates to topsoil as directed by Soil Testing Laboratory.
   2. Roto-till or otherwise mix amendments evenly into topsoil.

END OF SECTION

SECTION 32 9122

TOPSOIL GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
   1. Perform topsoil grading required to prepare site for installation of landscaping as described in Contract Documents.
   2. Perform topsoil placement and finish grading work required to prepare site for installation of landscaping as described in Contract Documents.
   3. Furnish and apply soil amendments as described in Contract Documents.

B. Related Requirements:
   1. Section 31 0501: ‘Common Earthwork Requirements’:
   2. Section 31 1413: ‘Topsoil Stripping And Stockpiling’ for stripping and storing of existing topsoil.
   3. Section 31 2216: ‘Fine Grading’ for landscaping and planting areas.
   4. Section 32 9001: 'Common Planting Requirements':
      a. Pre-installation conference held jointly with other common planting related sections.
   5. Section 32 9120: ‘Topsoil And Placement’ for topsoil evaluation and placement required for topsoil grading.
   6. Section 32 9121: ‘Topsoil Physical Preparation’ for physical preparation of topsoil (section included based on ‘Topsoil Testing Report’).

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 32 9001.
   2. In addition to agenda items specified in Section 01 3100, review the following:
      a. Review compost requirements to be within acceptable range as per Attachment 'Compost Quality Guidelines For Landscaping' and 'Compost Verification Report' in this specification.
      b. Review soil fertility amendments and fertilizer requirements as per Attachment 'Topsoil Testing Report' in Section 32 9120.

1.3 SUBMITTALS

A. Action Submittals:
   1. Material Data:
      a. Soil Amendments and Fertilizer:
         1) Product literature and chemical / nutrient analysis of soil amendments and fertilizers.
         2) Proposed application rates necessary to bring topsoil up to specified requirements.
         3) Source location of products.
         4) Submit to Landscape Architect for approval prior to installation.
   2. Samples:
      a. Soil Fertility Amendments and Fertilizer:
         1) Soil conditioner sample for approval before delivery to site.
         2) Product analysis.

B. Informational Submittals:
   1. Testing and Evaluation Reports:
      a. ‘Compost Verification Report’:

1) Provide signed copy certifying that compost meets requirements of this specification.

2. Field Quality Control Submittals:
   a. Soil Fertility Amendments and Fertilizer:
      1) Delivery slips indicating amount of soil amendments, compost, conditioner, and fertilizer delivered to Project site.

C. Closeout Submittals:
1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
   a. Record Documentation:
      1) Submit 'Compost Verification Report'.
      2) Submit delivery slips indicating amount of physical amendments delivered to Project site.

PART 2 - PRODUCTS

2.1 MATERIALS

Soil Amendments:
1. Contractor to add amendments and conditioners recommended by Topsoil Testing Laboratory form to bring composition of topsoil to meet the following standards:
   a. Chemical Characteristics:
      1) pH 5.5 to 8.0.
      2) Soluble Salts: less than 3.0 mmhos/cm.
      3) Sodium Absorption Ratio (SAR): less than 6.0.
      4) Organic Matter: greater than one percent.
   b. Physical Characteristics:
      1) Gradation as per Section 32 9121 "Topsoil Physical Preparation"
      2) Clean and free from toxic minerals and chemicals, noxious weeds, rocks larger than or equal to 1/2 inch in any dimension, and other objectionable materials.
      3) Soil:
         a) Soil shall not contain more than five (5) percent by volume of rocks measuring over 1/4 inch in largest size.
         b) Soil shall be topsoil in nature.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
1. Do not commence work of this Section until imported, stockpiled and in place topsoil are placed as specified in Section 32 9120 'Topsoil and Placement'.

3.2 PREPARATION

A. Protection Of In-Place Conditions:
1. Protect utilities and site elements from damage.

B. Surface Preparation:
1. Surfaces that meet specified topsoil elevations.
   a. Seven (7) days maximum before beginning seeding and planting:
      1) Loosen topsoil 6 inch deep, dampen thoroughly, and cultivate to properly break up clods and lumps.

2) Rake area to remove clods, rocks, weeds, roots, debris or other material 1-1/2 inches or more in any dimension.
3) Grade and shape landscape area to bring surface to true uniform planes free from irregularities and to provide drainage and proper slope to catch basins.

2. Addition of Soil Amendments:
   a. Add specified soil amendments at specified rates to topsoil as directed by Topsoil Testing Report found in Section 32 9120 'Topsoil and Placement'.
   b. Add specified fertilizers at specified rates into topsoil as directed by Soil Testing Laboratory.
   c. Roto-till or otherwise mix soil amendments evenly into topsoil.

3.3 PERFORMANCE

A. General:
   1. Limit use of heavy equipment to areas no closer than 6 feet from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6
   2. Do not expose or damage existing shrub or tree roots.

B. Finish Grade Tolerances (As shown on General Planting Details in Contract Documents):
   1. Finish topsoil grade of planting areas before planting and after addition of soil additives shall be specified distances below top of adjacent pavement of any kind:
      a. Ground Cover Areas: 2 inches below.
      b. Seeded Areas: One inch below.
      c. Sodded Areas: 2 inches below.
      d. Tree and Shrub Areas (not individual trees): 4 inches below.

C. Placed Topsoil:
   1. At locations where topsoil has been placed as per Section 32 9120 'Topsoil and Placement', perform the following:
      a. Remove existing vegetation as required in preparation for new landscaping.
      b. Remove organic material, rocks and clods greater than 1-1/2 inch in any dimension, and other objectionable materials.

D. Grading:
   1. Coordinate grading as described in Section 32 9120 'Topsoil and Placement'.

E. Immediately before planting lawn and with topsoil in semi-dry condition, roll areas that are to receive lawn in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs, depending on soil type.

F. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.

3.4 PROTECTION

A. After landscape areas have been prepared, take no heavy objects over them except lawn rollers.

END OF SECTION

ATTACHMENTS

COMPOST QUALITY GUIDELINES FOR LANDSCAPING

[Source: Von Isaman MS, President of QA Consulting and Testing LLC, Dr. Rich Koenig, USU Cooperative Extension Soils Specialist, and Dr. Teresa Cerny, USU Cooperative Extension Horticulturalist, 3 March 2003]

Category	pH[a]	Soluble Salts[a] dS/m or mmho/cm	Sodium Adsorption Ratio[a] (SAR)	Carbon Nitrogen Ratio[b] (C:N)	Percent Moisture[c]	≥ 98 percent Coarse Material Passing (dry wt basis)
Ideal	6 to 8	≤ 5	< 10	≤ 20:1	25 to 35	**3**/8 inch (9.5 mm)
Acceptable	5-6, 8-9	≤ 10	≤ 20	21:1 to 30:1	< 25, > 35	3/4 inch (19 mm)
Suspect	< 5, > 9	> 10	> 20	<10:1, > 30:1	< 20, > 50	< 98 percent 3/4 inch (19 mm)

[a] 1.5 Compost: Water Slurry on Coarse Material passing 3/8 inch (9.5 mm).
[b] on Coarse Material passing 3/8 inch (9.5 mm).
[c] on Total Sample

For composts with biosolid feedstocks, biosolids must meet EPA 503 Class A standard.

Acceptable level Soluble Salts and/or SAR composts should not exceed 3 cu yds (2.29 cu m) /1,000 sq ft (93 sq m) for every 3 inches (76 mm) of soil depth.

COMPOST VERIFICATION REPORT

	pH[a]	Soluble Salts[a] dS/m or mmho/cm	Sodium Adsorption Ratio[a] (SAR)	Carbon Nitrogen Ratio[b] (C:N)	Percent Moisture[c]	≥ 98 percent Coarse Material Passing (dry wt basis)
Results						

See Compost Quality Guidelines for Landscaping for footnote references.

I hereby certify that the Compost meets Ideal or Acceptable requirements as set forth in COMPOST QUALITY GUIDELINES FOR LANDSCAPING as listed with the COMPOST VERIFICATION STATEMENT. If Compost does not fall within this range, explain why and justify.

_____

_____

_____

_____

Signature: _____ Printed Signature: _____

Date: _____

SECTION 32 9223

SODDING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes but Not Limited To:
   1. Furnish and install sodded lawn as described in Contract Documents.

B. Related Requirements:
   1. Section 32 8423: Irrigation system.
   2. Section 32 9001: Common Planting Requirements:
      a. Pre-installation conference held jointly with other common planting related sections.
   3. Section 32 9120: 'Topsoil And Placement'.
   4. Section 32 9121: 'Topsoil Physical Preparation' (section included based on Topsoil Testing Report).
   5. Section 32 9122: 'Topsoil Grading'.

1.2 REFERENCES

A. Definitions:
   1. Crop Coefficients and Hydro-Zones: Crop coefficients (Kc) are used with ETo to estimate specific plant evapotranspiration rates. The crop coefficient is a dimensionless number (between 0 and 1.2) that is multiplied by the ETo value to arrive at a plant ET (ETc) estimate. Plants grouped by water needs, organized into one irrigation zone.
   2. Eco-Region Irrigation Design: A bio-regional approach to irrigation and planting design that is relevant to the geographic area for which the planting plan and irrigation system is designed. These geographic areas are defined by the Environmental Protection Agency and have been modified by the LDS church into 15 geographical areas throughout North America, and the Hawaiian Islands.
   3. Hardiness Zone: A hardiness zone is a more precisely geographically-defined zone within an Eco-Region in which a specific category of plant life is capable of growing, as defined by temperature hardiness, or ability to withstand the minimum temperatures of the zone. Hardiness Zones may be defined by one of two sources:
      a. Sunset Western Garden Book Maps.
      b. USDA Hardiness Zone Map.

      Plant Hardiness zone sources shall be listed by the architect through the planting and irrigation design process.
   4. Hydro-Zone: Plants grouped by water needs (similar Crop Coefficients (Kc), organized into one irrigation zone.
   5. Reference Evapotranspriation (ETo): The total water lost from the soil (evaporation) and from the plant surface (transpiration) over some period.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 32 9001.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Certificates:
      a. Written certification confirming sod seed mix and quality:
         1) Include all species used.
         2) Include name and contact information of supplier.

B. Closeout Submittals:
   1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Submit one (1) copy certificate for sod seed quality and mix.
      b. Landscape Management Plan (LMP):
         1) Landscape Section:
            a) Submit one (1) copy certificate for sod seed quality and mix.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Harvest, deliver, store, and handle sod in accordance with requirements of Turfgrass Producers International (TPI) (formally American Sod Producers Association) Specifications for Turfgrass Sod Materials and Transplanting / Installing.
   2. Schedule deliveries to coincide with topsoil operations and laying. Keep storage at job site to minimum without causing delays.
      a. Deliver, unload, and store sod on pallets within 24 hours of being lifted.
      b. Do not deliver small, irregular, or broken pieces of sod.

B. Storage and Handling Requirements:
   1. Cut sod in pieces approximately 3/4 to one inch thick. Roll or fold sod so it may be lifted and handled without breaking or tearing and without loss of soil.
   2. During wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling.
   3. During dry weather, protect sod from drying before installation. Water as necessary to insure vitality and to prevent excess loss of soil in handling. Sod that dries out before installation will be rejected.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Description:
   1. Superior sod grown from certified, high quality, seed of known origin or from plantings of certified grass seedlings or stolons:
      a. Assure satisfactory genetic identity and purity.
      b. Assure over-all high quality and freedom from noxious weeds or an excessive amount of other crop and weedy plants at time of harvest.
   2. Sod shall be composed of three varieties minimum of :
      a. 60% Perennial Rye Grass (30% each of two varieties from Allairell, Mahattan II, or Patriot II)
      b. 40% Kentucky Blue Grass (variety from Adelphi, Aspen, Baron, Bonniblue, Bristol, Continental, Fly King, Glade, Majestic, Merit, Parade, Raml, Rugby, Trenton or Victa)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
   1. Do not commence work of this Section until work of Sections 32 9113 and 32 9300 has been completed and approved.

B. Tolerances:
   1. Final grade of soil after sodding of lawn areas is complete shall be one inch below top of adjacent pavement of any kind.

C. Laying of Sod:
   1. Lay sod during growing season and within 48 hours of being lifted.
   2. Lay sod while top 6 inches of soil is damp, but not muddy. Sodding during freezing temperatures or over frozen soil is not acceptable.
   3. Lay sod in rows perpendicular to slope with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife.
   4. Lay sod flush with adjoining existing sodded surfaces.
   5. Do not sod slopes steeper than 3:1. Consult with Architect for alternate treatment.

D. After Laying of Sod Is Complete:
   1. Roll horizontal surface areas in two directions perpendicular to each other.
   2. Repair and re-roll areas with depressions, lumps, or other irregularities. Heavy rolling to correct irregularities in grade will not be permitted.
   3. Water sodded areas immediately after laying sod to obtain moisture penetration through sod into top 6 inches of topsoil.

3.2 FIELD QUALITY CONTROL

A. Field Inspection:
   1. Sodded areas will be accepted at Project closeout if:
      a. Sodded areas are properly established.
      b. Sod is free of bare and dead spots and is without weeds.
      c. No surface soil is visible when grass has been cut to height of 2 inches.
   2. Sodded areas have been mowed a minimum of twice.

END OF SECTION