

DSA SUBMITTAL

DSA APPL #02-122769

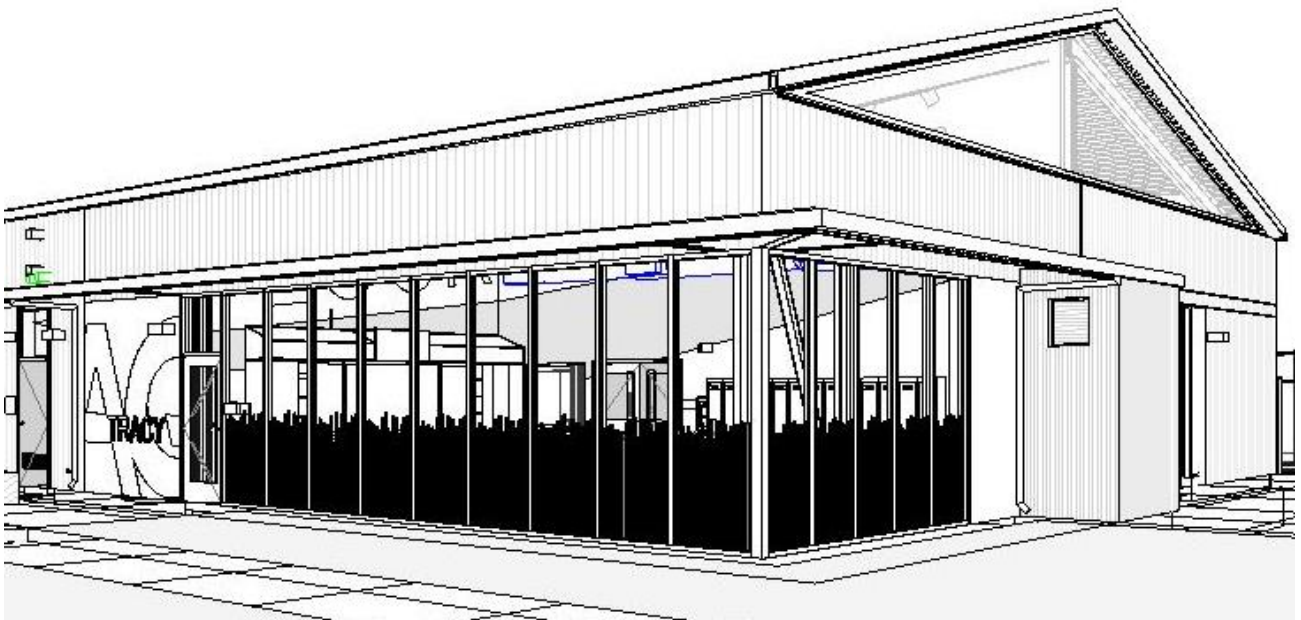
**MERRILL F WEST HS AGRICULTURE
CTE BLDG - INCREMENT 2**

1775 W. Lowell Ave., Tracy, CA 95376

3595002-100

Tracy Unified School District

1875 W. Lowell Ave., Tracy, CA 95376



HMC Architects

October 11, 2024

MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
Tracy Unified School District
Tracy, California

DSA Appl #02-122769

October 11, 2024
HMC #3595002-100

HMC ARCHITECTS
Architect

RW Engineers
Structural Engineer

MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
Tracy Unified School District
Tracy, California

DSA Appl #02-122769

October 11, 2024
HMC #3595002-100

Optimized Energy & Facilities Consulting, Inc.
Mechanical/Plumbing Engineers

Optimized Energy & Facilities Consulting, Inc.
Electrical Engineer

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
DSA SUBMITTAL
11 OCTOBER 2024

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HMC Architects
3595002100

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SITE LEASE

For all or a portion of the following Site:

WEST HIGH SCHOOL AG ADDITION PROJECT #2024/25-007
1775 West Lowell Avenue
Tracy, CA 95376
APN: 232-13-010

By and between

Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376

And

[Developer]
[Address]

Dated as of _____, 2024

SITE LEASE

This site lease ("Site Lease") dated as of _____, 2024 ("Effective Date"), is made and entered into by and between the Tracy Unified School District, a school district duly organized and validly existing under the laws of the State of California, as lessor ("District"), and _____ ("Developer"), a [California corporation] duly organized and existing under the laws of the State, as lessee (together, the "Parties").

RECITALS

WHEREAS, the District currently owns a parcel of land located at 1775 West Lowell Avenue, Tracy, CA 95376, known as West High School, as more particularly described in **Exhibit A** and shown on **Exhibit B** attached hereto and incorporated herein by this reference ("School Site"); and

WHEREAS, the District desires to provide for the development and construction of certain work to be performed on portions of the School Site. That work will include construction of improvements to be known as the West High School Ag Snop Addition Project #2024/25-007 ("Project"); and

WHEREAS, District desires to have the construction of the Project completed and to lease it back, as more particularly described in the facilities lease between the Parties dated as of the Effective Date whereby the Developer agrees to lease the Project Site back to the District and perform the work of the Project ("Facilities Lease"), which Facilities Lease is incorporated herein by this reference; and

WHEREAS, the Governing Board of the District ("Board") has determined that it is in the best interests of the District and for the common benefit of the citizens residing in the District to construct the Project by leasing the Project Site to Developer and by immediately entering into the Facilities Lease under which District will lease back the Project from Developer; and

WHEREAS, the District further determines that it has entered into this Site Lease and the Facilities Lease pursuant to Education Code section 17406 as the best available and most expeditious means for the District to satisfy its substantial need for the facilities to be provided by the Project and to accommodate and educate District students; and

WHEREAS, this Site Lease and Facilities Lease are awarded based on a competitive solicitation process pursuant to Education Code section 17406 and in compliance with the required procedures and guidelines for evaluating the qualifications of proposers adopted and published by the Board to the proposer providing the best value to the school district, taking into consideration the proposer's demonstrated competence and professional qualifications necessary for the satisfactory performance of the services required; and

WHEREAS, the selection of the Developer was conducted in a fair and impartial manner; and

WHEREAS, based on the above findings, the District is authorized under Education Code section 17406 to lease the Project Site to Developer and to have Developer develop and cause the construction of the Project thereon and lease the Project Site back to the District by means of the Facilities Lease, and the Board has duly authorized the execution and delivery of this Site Lease in order to effectuate the foregoing; and

WHEREAS, the Parties have performed all acts, conditions and things required by law to exist, to have happened, and to have been performed prior to and in connection with the execution and entering into this Site Lease, and those conditions precedent do exist, have happened, and have been performed in regular and due time, form, and manner as required by law, and the Parties hereto are now duly authorized to execute and enter into this Site Lease; and

WHEREAS, Developer as lessee is authorized and competent to lease the Project Site from District and to develop and cause the construction of the Project on the Project Site, and has duly authorized the execution and delivery of this Site Lease.

NOW, THEREFORE, in consideration of the promises and of the mutual covenants contained herein, and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties hereto do hereby agree as follows:

1. Definitions

Unless the context clearly otherwise requires, all words and phrases defined in the Facilities Lease shall have the same meaning in this Site Lease.

2. Exhibits

The following Exhibits are attached to and by reference incorporated and made a part of this Site Lease.

2.1. Exhibit A - Legal Description of the School Site: The legal description of the real property constituting the School Site.

2.2. Exhibit B - Description of the Project Site: The map or diagram depiction of the Project Site.

3. Lease of the Project Site

The District hereby leases to the Developer, and the Developer hereby leases from the District the Project Site, subject only to Permitted Encumbrances, in accordance with the provisions of this Site Lease, to have and to hold for the term of this Site Lease. This Site Lease shall only take effect if the Facilities Lease is executed by the District and Developer within three (3) days of execution of this Site Lease.

4. Leaseback of the Project Site

The Parties agree that the Project Site will be leased back to the District pursuant to the Facilities Lease for the term thereof.

5. Term

The term of this Site Lease shall commence as of the Effective Date and shall terminate on the last day of the Term of the Facilities Lease, provided the District has paid to the Developer, or its assignee, all payments which may be due under the Facilities Lease, and provided this Site Lease has not been terminated pursuant to the termination provisions of the Facilities Lease.

6. Payment

In consideration for the lease of the Project Site by the District to the Developer and for other good and valuable consideration, the Developer shall pay One Dollar (\$1.00) to the District upon execution of this Site Lease.

7. Termination

7.1. Termination Upon Purchase of Project

If the District exercises its option to purchase the Project pursuant to the Facilities Lease, then this Site Lease shall terminate concurrently with the District's buy out and termination of the Facilities Lease.

7.2. Termination Due to Default by Developer

If Developer defaults pursuant to the provision(s) of the Facilities Lease and the District terminates the Facilities Lease pursuant to the Facilities Lease provision(s) allowing termination, then the Developer shall be deemed to be in default of this Site Lease and this Site Lease shall terminate at the same time as the Facilities Lease.

7.3. Termination Due to Default by District

If District defaults pursuant to the provision(s) of the Facilities Lease, the Developer, or its assignee, will have the right, for the then remaining term of this Site Lease, to:

7.3.1. Take possession of the Project Site.

7.3.2. If it deems it appropriate, cause appraisal of the Project Site and a study of the then reasonable uses thereof.

7.3.3. Re-let the Project Site; and

7.3.4. Stop all Work associated with the Site Lease.

8. Title to School Site

During the term of this Site Lease, the District shall hold fee title to the School Site, including the Project Site, and nothing in this Site Lease or the Facilities Lease shall change, in any way, the District's ownership interest in the School Site.

9. Improvements

Title to all improvements made on the Project Site during the term hereof shall be held, vest and transfer pursuant to the terms of the Facilities Lease.

10. No Merger

The leaseback of the Project Site by the Developer to the District pursuant to the Facilities Lease shall not effect or result in a merger of the estates of the District in the Project Site, and the Developer shall continue to have a leasehold estate in the Project Site pursuant to this Site Lease throughout the term hereof.

11. Right of Entry

The District reserves the right for any of its duly authorized representatives to enter upon the Project Site at any reasonable time to inspect the same, provided the District follows all safety precautions required by the Developer.

12. Quiet Enjoyment

Subject to any rights the District may have under the Facilities Lease (in the absence of an Event of Default) to possession and enjoyment of the Project Site, the District hereby covenants and agrees that it will not take any action to prevent the Developer from having quiet and peaceable possession and enjoyment of the Project Site during the term hereof and will, at the request of the Developer, to the extent that it may lawfully do so, join in any legal action in which the Developer asserts its right to such possession and enjoyment.

13. Waste

The Developer agrees that at all times that it is in possession of the Project Site, it will not commit, suffer or permit any waste on the Project Site, and that it will not willfully or knowingly use or permit the use of the Project Site for any illegal purpose or act.

14. Further Assurances and Corrective Instruments

The Parties shall, from time to time, execute, acknowledge and deliver, or cause to be executed, acknowledged and delivered, such supplements hereto and such further instruments as may reasonably be required for correcting any inadequate or incorrect description of the Project Site hereby leased or intended so to be or for carrying out the expressed intention of this Site Lease and the Facilities Lease.

15. Representations of the District

The District represents, covenants and warrants to the Developer as follows:

15.1. Due Organization and Existence

The District is a school district, duly organized and existing under the Constitution and laws of the State of California.

15.2. Authorization

The District has the full power and authority to enter into, to execute and to deliver this Site Lease, and to perform all of its duties and obligations hereunder, and has duly authorized the execution of this Site Lease.

15.3. No Violations

To the best of the District's actual knowledge, neither the execution and delivery of this Site Lease nor the Facilities Lease, nor the fulfillment of or compliance with the terms and conditions hereof or thereof, nor the consummation of the transactions contemplated hereby or thereby, conflicts with or results in a breach of the terms, conditions or provisions of any restriction or any agreement or instrument to which the District is now a party or by which the District is bound, or constitutes a default under any of the foregoing, or results in the creation or imposition of any lien, charge

or encumbrance whatsoever upon any of the property or assets of the District, or upon the Project Site, except Permitted Encumbrances.

15.4. CEQA Compliance

The District has complied with all assessment requirements imposed upon it by the California Environmental Quality Act (Public Resource Code Section 21000 *et seq.* ("CEQA")) in connection with the Project, and no further environmental review of the Project is necessary pursuant to CEQA before the construction of the Project may commence.

15.5. Condemnation Proceedings

15.5.1. District covenants and agrees, but only to the extent that it may lawfully do so, that so long as this Site Lease remains in effect, the District will not seek to exercise the power of eminent domain with respect to the Project so as to cause a full or partial termination of this Site Lease and the Facilities Lease.

15.5.2. If for any reason the foregoing covenant is determined to be unenforceable or in some way invalid, or if District should fail or refuse to abide by such covenant, then, to the extent they may lawfully do so, the Parties agree that the financial interest of Developer shall be as indicated in the Facilities Lease.

15.6. Use and Zoning

To the best of the District's actual knowledge, the Project Site is properly zoned for its intended purpose and the use or activities contemplated by this Site Lease will not conflict with local, state or federal law.

15.7. Taxes

To the best of the District's actual knowledge, all taxes and assessments are paid current and such taxes and assessments will continue to be paid to the extent that the District is not exempt.

16. Representations of the Developer

The Developer represents, covenants and warrants to the District as follows:

16.1. Due Organization and Existence

The Developer is a California company duly organized and existing under the laws of the State of California, has power to enter into this Site Lease and the Facilities Lease; is possessed of full power to lease, leaseback, and hold real and personal property and has duly authorized the execution and delivery of all of the aforesaid agreements.

16.2. Authorization

The Developer has the full power and authority to enter into, to execute and to deliver this Site Lease, and to perform all of its duties and obligations hereunder, and has duly authorized the execution of this Site Lease.

16.3. No Violations

Neither the execution and delivery of this Site Lease or the Facilities Lease, nor the fulfillment of or compliance with the terms and conditions hereof or thereof, nor the consummation of the transactions contemplated hereby or thereby, conflicts with or results in a breach of the terms, conditions or provisions of any restriction or any agreement or instrument to which the Developer is now a party or by which the Developer is bound, or constitutes a default under any of the foregoing, or results in the creation or imposition of any lien, charge or encumbrance whatsoever upon any of the property or assets of the Developer, or upon the Project Site, except for Permitted Encumbrances.

16.4. No Bankruptcy

Developer is not now nor has it ever been in bankruptcy or receivership.

16.5. No Litigation

There is no pending or, to the knowledge of Developer, threatened action or proceeding before any court or administrative agency which will materially adversely affect the ability of Developer to perform its obligations under this Site Lease or the Facilities Lease.

17. Insurance and Indemnity

The Developer and the District shall comply with the insurance requirements and the indemnity requirements as indicated in the Facilities Lease.

18. Assignment and Subleasing

This Site Lease may be assigned and/or the Project Site subleased, as a whole or in part, by the Developer only upon the prior written consent of the District to such assignment or sublease, which shall not be unreasonably withheld.

19. Restrictions on District

The District agrees that it will not mortgage, sell, encumber, assign, transfer or convey the Project Site or any portion thereof during the term of this Site Lease in any way that would interfere with or diminish Developer's interests indicated in this Site Lease.

20. Liens and Further Encumbrances

Developer agrees to keep the Project Site and every part thereof free and clear of any and all encumbrances and/or liens, including without limitation, pledges, charges, encumbrances, claims, mechanic liens and/or other liens for or arising out of or in connection with work or labor done, services performed, or materials or appliances used or furnished for or in connection with the Project Site or the Project. Pursuant to the Facilities Lease, Developer further agrees to pay promptly and fully and discharge any and all claims on which any encumbrance and/or lien may or could be based, and to save and hold District free and harmless from any and all such liens, mortgages, and claims of liens and suits or other proceedings pertaining thereto. This subsection does not apply to Permitted Encumbrances.

21. **Notices**

All notices, certificates or other communications hereunder shall be sufficiently given and shall be deemed to have been received five (5) days after deposit in the United States mail in registered or certified form with postage fully prepaid or one (1) business day after deposit with an overnight delivery service with proof of actual delivery:

If to District:

Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376
Attn: Jaime Quintana

If to Developer:

[Developer]
[Address]
Attn: [Name, Title]

With a copy to:

Deidree Sakai, Esq.
Dannis Woliver Kelley
275 Battery Street, Suite 1150
San Francisco, CA 94111

With a copy to:

The Developer and the District, by notice given hereunder, may designate different addresses to which subsequent notices, certificates or other communications will be sent.

22. **Binding Effect**

This Site Lease shall inure to the benefit of and shall be binding upon the Developer and the District and their respective successors and assigns.

23. **No Additional Waiver Implied by One Waiver**

In the event any agreement contained in this Site Lease should be breached by either party and thereafter waived by the other party, such waiver shall be limited to the particular breach so waived and shall not be deemed to waive future compliance with any term hereof or any other breach hereunder.

24. **Severability**

In the event any provision of this Site Lease shall be held invalid or unenforceable by any court of competent jurisdiction, such holding shall not invalidate or render unenforceable any other provision hereof, unless elimination of such invalid provision materially alters the rights and obligations embodied in this Site Lease or the Facilities Lease.

25. **Amendments, Changes and Modifications**

Except as to the termination rights of both Parties as indicated in the Facilities Lease, this Site Lease may not be amended, changed, modified, altered or terminated without the written agreement of both Parties hereto.

26. **Obligations Absolute**

The Developer agrees that the obligations of the Developer are absolute and unconditional and not subject to any charges or setoffs against the District whatsoever.

27. Execution in Counterparts

This Site Lease may be executed in several counterparts, each of which shall be an original and all of which shall constitute one and the same instrument.

28. Developer and District Representatives

Whenever under the provisions of this Site Lease approval by the Developer or the District is required, or the Developer or the District is required to take some action at the request of the other, such approval or such request shall be given for the Developer by the Developer Representative and for the District by the District Representative, and any party hereto shall be authorized to rely upon any such approval or request.

29. Applicable Law

This Site Lease shall be governed by and construed in accordance with the laws of the State of California, and venued in the County within which the School Site is located.

30. Attorney's Fees

If either party brings an action or proceeding involving the School Site or to enforce the terms of this Site Lease or to declare rights hereunder, each party shall bear the cost of its own attorneys' fees.

31. Captions

The captions or headings in this Site Lease are for convenience only and in no way define, limit or describe the scope or intent of any provisions or sections of this Site Lease.

32. Prior Agreements

This Site Lease and the corresponding Facilities Lease collectively contain all of the agreements of the Parties hereto with respect to any matter covered or mentioned in this Site Lease and no prior agreements or understanding pertaining to any such matter shall be effective for any purpose.

33. Further Assurances

Parties shall promptly execute and deliver all documents and instruments reasonably requested to give effect to the provisions of this Site Lease.

34. Recitals Incorporated

The Recitals set forth at the beginning of this Site Lease are hereby incorporated into its terms and provisions by this reference.

35. Time of the Essence

Time is of the essence with respect to each of the terms, covenants, and conditions of this Site Lease.

36. Force Majeure

A party shall be excused from the performance of any obligation imposed in this Site Lease and the exhibits hereto for any period and to the extent that a party is prevented from performing such obligation, in whole or in part, as a result of delays caused by the other party or third parties, a governmental agency or entity, an act of God, war, terrorism, civil disturbance, forces of nature, fire, flood, earthquake, strikes or lockouts, and such non-performance will not be a default hereunder or a grounds for termination of this Site Lease.

37. Interpretation

None of the Parties hereto, nor their respective counsel, shall be deemed the drafters of this Site Lease or the Facilities Lease for purposes of construing the provisions of each. The language in all parts of this Site Lease shall in all cases be construed according to its fair meaning, not strictly for or against any of the Parties hereto.

IN WITNESS WHEREOF, the Parties have caused this Site Lease to be executed by their respective officers who are duly authorized, as of the Effective Date.

ACCEPTED AND AGREED on the date indicated below:

Dated: _____, 20_

Dated: _____, 20_

Tracy Unified School District

[Developer]

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

EXHIBIT A

LEGAL DESCRIPTION OF SCHOOL SITE

WEST HIGH SCHOOL AG ADDITION
1775 W. Lowell Avenue
Tracy CA 95376
PROJECT #232-13-010

Lot, according to the Official Maps or Plat thereof, filed for record in Volume of Maps and Plats, Page , County Records.

EXHIBIT B

DESCRIPTION OF PROJECT SITE

Attached is a map or diagram showing the location of the School Site that is subject to this Site Lease and upon which Developer will construct the Project.



FACILITIES LEASE

For all or a portion of the following Site:

WEST HIGH SCHOOL AG ADDITION
1775 W. Lowell Avenue
Tracy CA 95376
PROJECT #2024/25-007

By and between

Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376

And

[Developer]
[Address]

Dated as of _____, 20__

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Exhibits A - G

FACILITIES LEASE

This facilities lease ("Facilities Lease"), dated as of _____, 2024 ("Effective Date"), is made and entered into by and between _____ ("Developer"), a [California corporation] duly organized and existing under the laws of the State of California, as sublessor, and Tracy Unified School District, a school district duly organized and validly existing under the laws of the State of California, as sub lessee ("District") (together, the "Parties").

RECITALS

WHEREAS, the District is authorized under Section 17406 of the Education Code of the State of California to lease a site to a developer and to have that developer develop and construct the project on the site and to lease back to the District the site and the completed project; and

WHEREAS, the District desires to provide for the development and construction of certain work to be performed on portions of the School Site ("Project Site") which will include construction of improvements to be known as West High School Ag Shop Addition Project #2024/25-007 ("Project"); and

WHEREAS, on the date hereof, the District has leased to Developer, a parcel of land located at 1775 West Lowell Avenue, Tracy, CA 95376, known as West High School, particularly described in **Exhibit A** and shown on **Exhibit B** attached hereto and incorporated herein by reference ("School Site"); and

WHEREAS, District and Developer have executed a site lease at the same time as this Facilities Lease whereby the District is leasing the Project Site to the Developer ("Site Lease"); and

WHEREAS, District has retained HMC Architects ("Architect") to prepare plans and specifications for the Project ("Plans and Specifications") and to act as the Design Professional in General Responsible Charge for the Project; and

WHEREAS, the Governing Board of the District ("Board") has determined that it is in the best interests of the District and for the common benefit of the citizens residing in the District to construct the Project by leasing the Project Site to Developer and by simultaneously entering into this Facilities Lease under which the District will lease back the Project Site and the Project from Developer and if necessary, make Lease Payments; and

WHEREAS, the District further acknowledges and agrees that it has entered into the Site Lease and the Facilities Lease pursuant to Education Code Section 17406 as the best available and most expeditious means for the District to satisfy its substantial need for the facilities to be provided by the Project and to accommodate and educate District students and to utilize its facilities proceeds expeditiously; and

WHEREAS, this Site Lease and Facilities Lease are awarded based a competitive solicitation process pursuant to Education Code section 17406 and in compliance with the required procedures and guidelines for evaluating the qualifications of proposers adopted and published by the Board to the proposer providing the best value to the school district, taking into consideration the proposer's demonstrated competence and professional qualifications necessary for the satisfactory performance of the services required; and

WHEREAS, the selection of the Developer was conducted in a fair and impartial manner; and

WHEREAS, Developer has reviewed the Lease Documents; and

WHEREAS, Developer represents that it has the expertise and experience to perform the services set forth in this Facilities Lease; and

WHEREAS, the Parties have performed all acts, conditions and things required by law to exist, to have happened and to have been performed precedent to and in connection with the execution and entering into of this Facilities Lease and all those conditions precedent do exist, have happened and have been performed in regular and due time, form and manner as required by law, and the Parties hereto are now duly authorized to execute and enter into this Facilities Lease; and

WHEREAS, Developer is authorized to lease the Project Site as lessee and to develop the Project and to have the Project constructed on the Project Site and to lease the Project and the Project Site back to the District, and has duly authorized the execution and delivery of this Facilities Lease.

NOW, THEREFORE, in consideration of the above recitals and of the mutual covenants hereinafter contained, the Parties hereto do hereby agree as follows:

1. Definitions

In addition to the terms and entities defined above or in subsequent provisions, and unless the context otherwise requires, the terms defined in this section shall, for all purposes of this Facilities Lease, have the meanings herein specified.

1.1 "Developer" or "Lessor" means _____, a California corporation, organized and existing under the laws of the State of California, and its successors and assigns.

1.2 "Developer's Representative" means the Managing Member of Developer, or any person authorized to act on behalf of Developer under or with respect to this Facilities Lease.

1.3 "Contract Documents" are defined in **Exhibit D** to this Facilities Lease.

1.4 "District" or "Lessee" means the Tracy Unified School District, a school district duly organized and existing under the laws of the State of California.

1.5 "District Representative" means the Superintendent of the District, or any other person authorized by the Governing Board of the District to act on behalf of the District under or with respect to this Facilities Lease.

1.6 "Permitted Encumbrances" means, as of any particular time:

1.6.1 Liens for general ad valorem taxes and assessments, if any, not then delinquent, or which the District may permit to remain unpaid;

1.6.2 The Site Lease.

1.6.3 This Facilities Lease.

1.6.4 Easements, rights of way, mineral rights, drilling rights and other rights, reservations, covenants, conditions or restrictions which exist of record as of the date of this Facilities Lease.

1.6.5 Easements, rights of way, mineral rights, drilling rights and other rights, reservations, covenants, conditions or restrictions established following the date of recordation of this Facilities Lease and to which Developer and the District consent in writing which will not impair or impede the operation of the Project Site.

2. Exhibits

The following Exhibits are attached to and by reference incorporated and made a part of this Facilities Lease:

2.1 Exhibit A - Legal Description of the School Site: The description of the real property constituting the School Site.

2.2 Exhibit B - Description of the Project Site: The map or diagram depiction of the Project Site.

2.3 Exhibit C - Guaranteed Maximum Price and Other Project Cost, Funding, and Payment Provisions: A detailed description of the Guaranteed Maximum Price and the provisions related to the payment of that amount to the Developer, including Attachment 3, the Schedule of Lease Payments and Payoff Dates and Amounts.

2.4 Exhibit D - General Construction Provisions: The provisions generally describing the Project's construction.

2.5 Exhibit D-1 – Special Conditions Provisions: The provisions describing conditions specific to the Project's construction.

2.6 Exhibit E - Memorandum of Commencement Date: The Memorandum which will memorialize the commencement and expiration dates of the Lease Term.

2.7 Exhibit F - Construction Schedule

2.8 Exhibit G – Schedule of Values

3. Lease of Project and Project Site

3.1 Developer hereby leases the Project and the Project Site to the District, and the District hereby leases said Project and Project Site from Developer upon the terms and conditions set forth in this Facilities Lease.

3.2 The leasing by Developer to the District of the Project Site shall not affect or result in a merger of the District's leasehold estate pursuant to this Facilities Lease and its fee estate as lessor under the Site Lease. Developer shall continue to have and hold a leasehold estate in the Project Site pursuant to the Site Lease throughout the Term thereof and the Term of this Facilities Lease.

3.3 As to the Project Site, this Facilities Lease shall be deemed and constitute a sublease.

4. Term

4.1 Facilities Lease is Legally Binding

This Facilities Lease is legally binding on the Parties upon execution by the Parties and the District Board's approval of this Facilities Lease. The "Term" of this Facilities Lease for the purposes of District's obligation to make Lease Payments shall commence on the earlier of the following two (2) events, whichever occurs first ("Commencement Date"):

4.1.1 The date the District takes beneficial occupancy of the Project; or

4.1.2 The date when Developer delivers possession of the Project to District and when all improvements to be provided by Developer are determined by the District to be completed as set forth in **Exhibit D and D-1** to this Facilities Lease.

Unless earlier terminated pursuant to the provisions of the Contract Documents, the Term of this Facilities Lease for the purposes of District's obligations to make Lease Payments shall terminate **one (1) year** thereafter or upon payment of the final lease payment.

4.2 After Developer has completed construction of the Project and the District has accepted the Project, the Parties shall execute the Memorandum of Commencement Date attached hereto as **Exhibit E** to memorialize the commencement date of the Lease Payments and expiration date of the Term. Notwithstanding this Term, the Parties hereby acknowledge that each has obligations, duties, and rights under this Facilities Lease that exist upon execution of this Facilities Lease and prior to the beginning of the Lease Payment obligations.

4.3 The Term may be extended or shortened upon the occurrence of the earliest of any of the following events, which shall constitute the end of the Term:

4.3.1 An Event of Default by District as defined herein and Developer's election to terminate this Facilities Lease as permitted herein; or

4.3.2 An Event of Default by Developer as defined herein and District's election to terminate this Facilities Lease as permitted herein; or

4.3.3 Consummation of the District's purchase option pursuant to the Guaranteed Maximum Price and Other Project Cost, Funding, and Payment Provisions indicated in **Exhibit C** ("Guaranteed Maximum Price Provisions"); or

4.3.4 A third-party taking of the Project under Eminent Domain, only if the Term is ended as indicated more specifically herein; or

4.3.5 Damage or destruction of the Project, only if the Term is ended as indicated more specifically herein.

5. Payment

In consideration for the lease of the Project Site by the Developer back to the District and for other good and valuable consideration, the District shall make all necessary payments pursuant to the Guaranteed Maximum Price Provisions indicated in **Exhibit C**.

6. Title

6.1 During the Term of this Facilities Lease, the District shall hold fee title to the School Site, including the Project Site, and nothing in this Facilities Lease or the Site Lease shall change, in any way, the District's ownership interest.

6.2 During the Term of this Facilities Lease, Developer shall have a leasehold interest in the Project Site pursuant to the Site Lease.

6.3 During the Term of this Facilities Lease, the Developer shall hold title to the Project improvements provided by Developer which comprise fixtures, repairs, replacements or modifications thereto.

6.4 If the District exercises its Purchase Option pursuant to the Guaranteed Maximum Price Provisions indicated in **Exhibit C** or if District makes all necessary payments under the Guaranteed Maximum Price Provisions indicated in **Exhibit C**, all right, title and interest of Developer, its assigns and successors in interest in and to the Project and the Project Site shall be transferred to and vested in the District at the end of the Term. Title shall be transferred to and vested in the District hereunder without the necessity for any further instrument of transfer; provided, however, that Developer agrees to execute any instrument requested by District to memorialize the termination of this Facilities Lease and transfer of title to the Project.

7. Quiet Enjoyment

Upon District's possession of the Project, Developer shall thereafter provide the District with quiet use and enjoyment of the Project, and the District shall during the Term peaceably and quietly have and hold and enjoy the Project, without suit, trouble or hindrance from Developer, except as otherwise may be set forth in this Facilities Lease. Developer will, at the request of the District and at Developer's cost, join in any legal action in which the District asserts its right to such possession and enjoyment to the extent Developer may lawfully do so. Notwithstanding the foregoing, Developer shall have the right to inspect the Project and the Project Site as provided herein.

8. Representations of the District

The District represents, covenants and warrants to the Developer as follows:

8.1 Due Organization and Existence

The District is a school district, duly organized and existing under the Constitution and laws of the State of California.

8.2 Authorization

The District has the full power and authority to enter into, to execute and to deliver this Facilities Lease, and to perform all of its duties and obligations hereunder, and has duly authorized the execution of this Facilities Lease.

8.3 No Violations

Neither the execution and delivery of this Facilities Lease nor the Site Lease, nor the fulfillment of or compliance with the terms and conditions hereof or thereof, nor the consummation of the transactions contemplated hereby or thereby, conflicts with or results in a breach of the terms, conditions or provisions of any restriction or any agreement or instrument to which the District is now a party or by which the District is bound, or constitutes a default under any of the foregoing, or results in the creation or imposition of any lien, charge or encumbrance whatsoever upon any of the property or assets of the District, or upon the Project Site, except Permitted Encumbrances.

8.4 Condemnation Proceedings

8.4.1 District covenants and agrees, but only to the extent that it may lawfully do so, that so long as this Facilities Lease remains in effect, the District will not seek to exercise the power of eminent domain with respect to the Project so as to cause a full or partial termination of this Facilities Lease.

8.4.2 If for any reason the foregoing covenant is determined to be unenforceable or in some way invalid, or if District should fail or refuse to abide by such covenant, then, to the extent it may lawfully do so, District agrees that the financial interest of Developer shall be as indicated in this Facilities Lease.

9. Representations of the Developer

The Developer represents, covenants and warrants to the District as follows:

9.1 Due Organization and Existence

The Developer is a California company duly organized and existing under the laws of the State of California, has the power to enter into this Facilities Lease and the Site Lease; is possessed of full power to lease, lease back, and hold real and personal property and has duly authorized the execution and delivery of all of the aforesaid agreements.

9.2 Authorization

Developer has the full power and authority to enter into, to execute and to deliver this Facilities Lease, and to perform all of its duties and obligations hereunder, and has duly authorized the execution of this Facilities Lease.

9.3 No Violations

Neither the execution and delivery of this Facilities Lease and the Site Lease, nor the fulfillment of or compliance with the terms and conditions hereof or thereof, nor the consummation of the transactions contemplated hereby or thereby, conflicts with or results in a breach of the terms, conditions or provisions of any restriction or any

agreement or instrument to which Developer is now a party or by which Developer is bound, or constitutes a default under any of the foregoing, or results in the creation or imposition of any lien, charge or encumbrance whatsoever upon any of the property or assets of Developer, or upon the Project Site, except Permitted Encumbrances.

9.4 No Bankruptcy

Developer is not now nor has it ever been in bankruptcy or receivership.

9.5 No Encumbrances

Developer shall not pledge any District payments of any kind, related to the Site Lease, this Facilities Lease, or in any way derived from the Project Site, and shall not mortgage or encumber the Project Site, except as may be specifically permitted pursuant to the provisions of this Facilities Lease related to Developer's financing the construction of the project.

9.6 Continued Existence

Developer shall not voluntarily commence any act intended to dissolve or terminate the legal existence of Developer, at or before the latest of the following:

9.6.1 Eighteen (18) months following completion of the Project.

9.6.2 One (1) year following expiration or earlier termination of the Term.

9.6.3 After dismissal and final resolution of any and all disputes between the Parties and/or any third-party claims related, in any way, to the Project.

While the lease documents are in effect, Developer shall give District one hundred twenty (120) days written notice prior to dissolving or terminating the legal existence of Developer.

10. Pre-construction Services

10.1 Scope of the Preconstruction Services

Developer shall perform management and coordination services, plan and specification constructability reviews, provide value-engineering reviews and recommendations and other reviews as necessary to verify that the drawings and specifications are clear and reasonably accurate to minimize the need for changes during the construction phase of the project, including but not limited to the following:

10.1.1 General Services

10.1.1.1 Developer shall prepare a rough schedule in a format acceptable to District, and update as necessary.

10.1.1.2 Developer shall prepare and update the components of the Guaranteed Maximum Price and shall be primarily responsible for ensuring that the Project can and is constructed for no more than that amount.

10.1.2 Review of Design Documents.

10.1.2.1 Review Project design and budget with District and Architect based on the 100% Construction Documents submitted to DSA to:

10.1.2.1.1 Provide recommendations on relative feasibility of construction methods, availability of materials and labor, time requirements for procurement, installation and construction of the Project and subparts thereof if requested, and factors relating to cost including, but not limited to, construction costs of alternate designs of materials, preliminary budgets and possible economics that could be achieved through alternate methods or substitutions;

10.1.2.1.2 Value-engineering. Prepare a value-engineering report for District review and approval that:

10.1.2.1.2.1 Details areas of cost saving (e.g. construction processes/procedures, specified materials and equipment, and equipment or other aspects of the design documents that can be modified to reduce costs and/or the time for achieving final completion of the Project and/or to extend life-cycle and/or to reduce maintenance/operations costs, without diminution in the quality of materials/equipment/workmanship, scope or intended purposes of the Project);

10.1.2.1.2.2 Provides detailed estimate for proposed value-engineering items;

10.1.2.1.2.3 Defines methodology or approaches that maximize value; and

10.1.2.1.2.4 Identifies design choices that can be more economically delivered.

10.1.2.2 Confirm Modifications to Design Drawings. If the District accepts Developer's comments, including the value-engineering and/or constructability review comments, review the design documents to confirm that those comments are properly incorporated into the final design documents.

10.1.3 Construction Schedule and Phasing Plan

Developer shall prepare a full construction schedule for the Project detailing the phasing and construction activities.

10.1.4 Construction Planning and Bidding

10.1.4.1 For all of Developer's activities relating to construction planning and bidding, Developer shall comply with all applicable legal

requirements, including but not limited to those set forth in Education Code section 17406.

10.1.4.2 Prepare and distribute specifications and drawings provided by District to facilitate bidding to Developer's subcontractors.

10.1.4.3 Review the drawings and specifications to eliminate areas of conflict and overlapping in the work to be performed by various subcontractors, and with a view to eliminating change order requests by the Architect or subcontractors.

10.1.4.4 Conduct pre-bid conferences. Coordinate with District and the Architect in responding to subcontractor questions or providing clarification to all subcontractors.

10.1.4.5 The GMP shall be presented to the District in the following manner within a three ring binder as well as electronically on an external memory device such as a CD, USB drive, or other comparable device:

10.1.4.5.1 Cover sheet, signed by the developer indicating the GMP dollar amount with a certification, indicating that the GMP is all inclusive per the plans, specifications and addenda (contract documents). Also include certification stating, "Developer hereby certifies that they have reviewed all subcontractor proposals and whether the subcontractor excluded portions of their scope the Developer has included all costs for a complete GMP in accordance with plans, specifications and addenda."

10.1.4.5.2 A bid tabulation sheet indicating the breakdown by subcontractor/trade along with the appropriate general condition amount, other fees (as submitted with the response to the RFP).

10.1.4.5.3 Behind the bid tabulation sheet mentioned in subdivision 10.1.5.5.2 above should be a sheet that indicates what is included in the general conditions, which should match what was submitted in the response to the RFP.

10.1.4.5.4 Copies of all subcontractor bids received divided by trade that corresponds to the final spread sheet with a cover sheet indicating the scope and subcontractors that provided bids as well as those that were asked to bid, but did not submit a proposal. This sheet should have the dollar amounts for each subcontractor that provided a bid with the first column being the proposed subcontractor for that trade.

10.1.4.5.5 Behind subdivision 10.1.5.5.4 above should be the bids for that trade with the proposed subcontractor bid on top and the other subcontractor bids in descending dollar order.

10.1.4.6 Produce detailed construction CPM schedules to be incorporated into the Project documents including identification of the Project critical path and agency approvals.

10.1.4.7 Plan the phases and staging of construction, staging areas, temporary fencing, office trailer placement, access, etc. as required.

10.1.4.8 Any other services that are reasonable and necessary to control the budget and schedule. List those areas where subconsultants will be required and where the Respondent has in-house expertise. Provide resumes of persons providing each of these services and for key personnel assigned to the Project.

10.2 Schedule

Preconstruction services outlined above will commence on the date the District issues a Notice to Proceed with Preconstruction Services for the Agreement, and conclude upon approval of the Amendment to the Lease Agreements by District's Board, or termination of this Agreement by either party per the Agreement's terms. Any extension shall be subject to reasonable approval in writing by the Parties.

10.3 Ownership of Records

It is mutually agreed that all materials prepared by Developer under this Agreement shall become the property of the District and Developer shall have no property right therein whatsoever. Developer hereby assigns to District any copyrights associated with the materials prepared pursuant to the Agreement.

10.4 Open Book Policy

There will be an open book policy with Developer and its construction team. District shall have access to all subcontractor bids, value engineering back-up, contingency breakdown & tracking, and Developer fees.

10.5 Compensation to Developer for Preconstruction Services

District agrees to reimburse Developer in the total amount not to exceed One Thousand Dollars (\$1,000.00), for the performance of services contemplated by this Agreement. Developer shall be paid monthly for the actual fees and allowed costs and expenses for all time and materials required and expended for work requested and specified by the District as completed. Said amount shall be paid within thirty (30) days upon submittal to and verification by the District of a monthly billing statement showing completion of the tasks for that month on a line item basis. In the event Developer and District enter into the lease/leaseback agreements for the development of the Project, this compensation for services rendered will be included as part of the Guaranteed Maximum Price ("GMP") to be paid to Developer by District.

Developer shall be responsible for any and all costs and expenses incurred by Developer, including but not limited to the costs of hiring sub-consultants, contractors and other professionals, review of the Project's Plans and Specifications, review and preparation of necessary documentation relating to the development of the Project, all travel-related expenses, as well as for meetings with District and its representatives,

long distance telephone charges, copying expenses, salaries of Developer staff and employees working on the Project, overhead, and any other reasonable expenses incurred by Developer in performance of the services contemplated by this Agreement.

10.6 Termination before Construction Phase

10.6.1 Before the notice to proceed with the Construction Phase is issued by the District, this Agreement may be terminated at any time without cause by District upon fourteen (14) days written notice to Developer. In the event of such a termination by District, the District shall pay Developer for all undisputed services performed and expenses incurred per this Agreement, supported by documentary evidence, including, but not limited to, payroll records, invoices from third parties retained by Developer pursuant to this Agreement, and expense reports up until the date of notice of termination plus any sums due Developer for Board-approved extra services. In ascertaining the services actually rendered hereunder up to the date of termination of this Agreement, consideration shall be given to completed work and work in process that would best serve the District if a completed product was presented.

10.6.2 In the event that the Parties do not reach an agreement on the GMP, this Agreement will be terminated at that time. In the event of such a termination, the District shall pay Developer no more than the not to exceed amount in Section 10.5 above.

10.7 Construction Phase

Developer shall not commence any construction work before DSA approval of the Plans and Specifications.

11. Construction of Project

11.1 Construction of Project

11.1.1 Developer agrees to cause the Project to be developed, constructed, and installed in accordance with the terms hereof and the Construction Provisions set forth in **Exhibit D**, including those things reasonably inferred from the Contract Documents as being within the scope of the Project and necessary to produce the stated result even though no mention is made in the Contract Documents.

11.1.2 Contract Time / Construction Schedule

It is hereby understood and agreed that the Contract Time for this Project shall be Four Hundred Fifty-Seven (457) calendar days, commencing with the date upon which the Facilities Lease and the Site Lease are fully executed and delivered to both Parties and ending with completion of the Work which will occur no later than September 1, 2021 ("Contract Time"). The Construction Schedule must be approved by the District.

11.1.3 Schedule of Values

The Developer has provided a schedule of values, approved by the District, which will be attached hereto as **Exhibit G** ("Schedule of Values"). The Schedule of Values must be approved by the District.

11.1.4 Liquidated Damages

Time is of the essence for all work Developer must perform to complete the Project. It is hereby understood and agreed that it is and will be difficult and/or impossible to ascertain and determine the actual damage that the District will sustain in the event of and by reason of Developer's delay; therefore, Developer agrees that it shall pay to the District the sum of Three Thousand Dollars (\$3,000) per day as liquidated damages for each and every day's delay beyond the Contract Time.

11.1.4.1 It is hereby understood and agreed that this amount is not a penalty.

11.1.4.2 In the event any portion of the liquidated damages is not paid to the District, the District may deduct that amount from any money due or that may become due the Developer under this Facilities Lease. The District's right to assess liquidated damages is as indicated herein and in **Exhibit D**.

11.1.4.3 The time during which the construction of the Project is delayed for cause as hereinafter specified may extend the time of completion for a reasonable time as the District may grant.

11.1.5 Guaranteed Maximum Price

Developer will cause the Project to be constructed within the GMP as set forth and defined in the GMP provisions in **Exhibit C**, and Developer will not seek additional compensation from District in excess of that amount.

11.1.6 Modifications

If the DSA requires changes to the Contract Documents submitted by District to Developer, and those changes change the construction costs and/or construction time for the Project, then those changed costs or time will be handled as a modification pursuant to the provisions of **Exhibit D**.

12. Maintenance

Following delivery of possession of the Project by Developer to District, the repair, improvement, replacement and maintenance of the Project and the Project Site shall be at the sole cost and expense and the sole responsibility of the District, subject only to all punch list items and warranties against defects in materials and workmanship of Developer as provided in **Exhibit D**. The District shall pay for or otherwise arrange for the payment of the cost of the repair and replacement of the Project resulting from ordinary wear and tear. The District waives the benefits of subsections 1 and 2 of Section 1932 of the California Civil Code, but such waiver shall not limit any of the rights of the District under the terms of this Facilities Lease.

13. Utilities

Following delivery of possession of the Project by Developer to District, the cost and expenses for all utility services, including, but not limited to, electricity, natural gas, telephone, water, sewer, trash removal, cable television, janitorial service, security, heating, water, internet service, data transmission, and all other utilities of any type shall be paid by District.

14. Taxes and Other Impositions

All ad valorem real property taxes, special taxes, possessory interest taxes, bonds and special lien assessments or other impositions of any kind with respect to the Project, the Project Site and the improvements thereon, charged to or imposed upon either Developer or the District or their respective interests or estates in the Project, shall at all times be paid by District. In the event any possessory interest tax is levied on Developer, its successors and assigns, by virtue of this Facilities Lease or the Site Lease, District shall pay such possessory interest tax directly, if possible, or shall reimburse Developer, its successors and assigns for the full amount thereof within forty-five (45) days after presentation of proof of payment by Developer.

15. Insurance

15.1 Developer's Insurance

The Developer shall comply with the insurance requirements as indicated here and in **Exhibit D and D-1**.

15.1.1 Commercial General Liability and Automobile Liability Insurance

15.1.1.1 Developer shall procure and maintain, during the life of the Project, Commercial General Liability Insurance and Automobile Liability Insurance that shall protect Developer, District, its Board Members, employees, agents, Construction Manager(s), Project Manager(s), Project Inspector(s), and Architect(s) from all claims for bodily injury, property damage, personal injury, death, advertising injury, and medical payments arising from, or in connection with, operations under the Project. This coverage shall be provided in a form at least as broad as Insurance Services (ISO) Form CG 00 01 11 88. Developer shall ensure that Products Liability and Completed Operations coverage, Fire Damage Liability coverage, and Automobile Liability coverage including owned, non-owned, and hired automobiles, are included within the above policies and at the required limits, or Developer shall procure and maintain these coverages separately.

15.1.1.2 Developer's deductible or self-insured retention for its Commercial General Liability Insurance policy shall not exceed five thousand dollars (\$5,000) for deductible or twenty-five thousand dollars (\$25,000) for self-insured retention, respectively, unless approved in writing by District.

15.1.1.3 All such policies shall be written on an occurrence form.

15.1.2 Excess Liability Insurance

15.1.2.1 If Developer's underlying policy limits are less than required, subject to 15.1.2.3 below, Developer may procure and maintain, during the life of the Project, an Excess Liability Insurance Policy to meet the policy limit requirements of the required policies in order to satisfy, in aggregate with its underlying policy, the insurance requirements herein.

15.1.2.2 There shall be no gap between the per occurrence amount of any underlying policy and the start of the coverage under the Excess Liability Insurance Policy. Any Excess Liability Insurance Policy shall protect Developer, District, its Board Members, employees, agents, Construction Manager(s), Project Manager(s), Project Inspector(s), and Architect(s) in amounts and including the provisions as set forth in **Exhibit D and D-1** and/or the Supplementary Conditions (if any), and that complies with all requirements for Commercial General Liability and Automobile Liability and Employers' Liability Insurance.

15.1.2.3 The District, in its sole discretion, may accept the Excess Liability Insurance Policy that brings Developer's primary limits to the minimum requirements herein.

15.1.3 Subcontractor

Developer shall require its Subcontractor(s), if any, to procure and maintain Commercial General Liability Insurance, Automobile Liability Insurance, and Excess Liability Insurance (if Subcontractor elects to satisfy, in part, the insurance required herein by procuring and maintaining an Excess Liability Insurance Policy) with minimum limits at least equal to the amount required of the Developer except where smaller minimum limits are permitted as set forth below.

15.1.4 Workers' Compensation and Employers' Liability Insurance

15.1.4.1 In accordance with provisions of section 3700 of the California Labor Code, the Developer and every Subcontractor shall be required to secure the payment of compensation to its employees.

15.1.4.2 Developer shall procure and maintain, during the life of the Project, Workers' Compensation Insurance and Employers' Liability Insurance for all of its employees engaged in work under the Project, on/or at the Site of the Project. This coverage shall cover, at a minimum, medical and surgical treatment, disability benefits, rehabilitation therapy, and survivors' death benefits. Developer shall require its Subcontractor(s), if any, to procure and maintain Workers' Compensation Insurance and Employers' Liability Insurance for all employees of Subcontractor(s). Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by Developer's insurance. If any class of employee or employees engaged in Work on the Project, on or at the Site of

the Project, is not protected under the Workers' Compensation Insurance, Developer shall provide, or shall cause a Subcontractor to provide, adequate insurance coverage for the protection of any employee(s) not otherwise protected before any of those employee(s) commence work.

15.1.5 Builder's Risk Insurance: Builder's Risk "All Risk" Insurance

15.1.5.1 Developer shall procure and maintain, during the life of this Contract, Builder's Risk (Course of Construction), or similar first party property coverage acceptable to the District, issued on a replacement cost value basis. The cost shall be consistent with the total replacement cost of all insurable Work of the Project included within the Contract Documents. Coverage is to insure against all risks of accidental physical loss and shall include without limitation the perils of vandalism and/or malicious mischief (both without any limitation regarding vacancy or occupancy), sprinkler leakage, civil authority, theft, sonic disturbance, earthquake, flood, collapse, wind, rain, dust, fire, war, terrorism, lightning, smoke, and rioting. Coverage shall include debris removal, demolition, increased costs due to enforcement of all applicable ordinances and/or laws in the repair and replacement of damaged and undamaged portions of the property, and reasonable costs for the Architect's and engineering services and expenses required as a result of any insured loss upon the Work and Project, including completed Work and Work in progress, to the full insurable value thereof.

15.1.6 Pollution Liability Insurance

15.1.6.1 Developer shall procure and maintain Pollution Liability Insurance that shall protect Developer, District, Construction Manager(s), Project Inspector(s), and Architect(s) from all claims for bodily injury, property damage, including natural resource damage, cleanup costs, removal, storage, disposal, and/or use of the pollutant arising from operations under this Facilities Lease, and defense, including costs and expenses incurred in the investigation, defense, or settlement of claims. Coverage shall apply to sudden and/or gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants, including asbestos. This coverage shall be provided in a form at least as broad as Insurance Services Offices, Inc. (ISO) Form CG 2415, or Developer shall procure and maintain these coverages separately.

15.1.6.2 Developer warrants that any retroactive date applicable to coverage under the policy shall predate the Effective Date of this Facilities Lease and that continuous coverage will be maintained or an extended reporting or discovery period will be exercised for a period of three (3) years, beginning from the time that the Work under the Contract is completed.

15.1.6.3 If Developer is responsible for removing any pollutants from a site, then Developer shall ensure that Any Auto, including owned, non-owned, and hired, are included within the above policies and at the required limits, to cover its automobile exposure for transporting the pollutants from the site to an approved disposal site. This coverage shall include the Motor Carrier Act Endorsement, MCS 90.

**15.1.7 Proof of Carriage of Insurance and Other Requirements
Endorsements and Certificates**

15.1.7.1 Developer shall not commence Work nor shall it allow any Subcontractor to commence Work on the Project, until Developer and its Subcontractor(s) have procured all required insurance and Developer has delivered in duplicate to the District complete endorsements (or entire insurance policies) and certificates indicating the required coverages have been obtained, and the District has approved these documents.

15.1.7.2 Endorsements, certificates, and insurance policies shall include the following:

15.1.7.2.1 A clause stating the following, or other language acceptable to the District:

"This policy shall not be canceled until notice has been mailed to District, Architect, and Construction Manager stating date of cancellation by the insurance carrier. Date of cancellation may not be less than thirty (30) days after date of mailing notice."

15.1.7.2.2 Language stating in particular those insured, extent of insurance, location and operation to which insurance applies, expiration date, to whom cancellation notice will be sent, and length of notice period.

15.1.7.3 All endorsements, certificates and insurance policies shall state that District, its Board Members, employees and agents, Construction Manager(s), Project Manager(s), Inspector(s) and Architect(s) are named additional insureds under all policies except Workers' Compensation Insurance and Employers' Liability Insurance.

15.1.7.4 Insurance written on a "claims made" basis shall be retroactive to a date that coincides with or precedes Contractor's commencement of Work, including subsequent policies purchased as renewals or replacements. Said policy is to be renewed by the Developer and all Subcontractors for a period of five (5) years following completion of the Work or termination of this Facilities Lease. Such insurance must have the same coverage and limits as the policy that was in effect during the term of this Facilities Lease,

and will cover the Developer and all Subcontractors for all claims made.

15.1.7.5 Developer's and Subcontractors' insurance policy(s) shall be primary and non-contributory to any insurance or self-insurance maintained by District, its Board Members, employees and/or agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s), and/or Architect(s).

15.1.7.6 All endorsements shall waive any right to subrogation against any of the named additional insureds.

15.1.7.7 All policies shall be written on an occurrence form.

15.1.7.8 All of Developer's insurance shall be with insurance companies with an A.M. Best rating of no less than A: XI.

15.1.7.9 The insurance requirements set forth herein shall in no way limit the Developer's liability arising out of or relating to the performance of the Work or related activities.

15.1.7.10 Failure of Developer and/or its Subcontractor(s) to comply with the insurance requirements herein shall be deemed a material breach of the Facilities Lease and constitute a Default by the Developer pursuant to this Facilities Lease.

15.1.8 Insurance Policy Limits

The limits of insurance shall not be less than the following amounts:

COMMERCIAL GENERAL LIABILITY	Combined Single Limit	\$10,000,000
	Product Liability and Completed Operations, Fire Damage Liability – Split Limit	\$10,000,000
AUTOMOBILE LIABILITY – ANY AUTO	Combined Single Limit	\$5,000,000
WORKERS COMPENSATION		Statutory limits pursuant to State law
EMPLOYERS' LIABILITY		\$5,000,000
BUILDER'S RISK (COURSE OF CONSTRUCTION)		Issued for the value and scope of Work indicated herein.
POLLUTION LIABILITY		\$1,000,000 per claim; \$2,000,000 aggregate

The limits of insurance for those subcontractors whose subcontract does not exceed One Million Dollars (\$1,000,000) shall not be less than the following amounts:

COMMERCIAL GENERAL LIABILITY	Combined Single Limit	\$2,000,000
	Product Liability and Completed Operations, Fire Damage Liability – Split Limit	\$2,000,000
AUTOMOBILE LIABILITY - ANY AUTO	Combined Single Limit	\$2,000,000
WORKERS COMPENSATION		Statutory limits pursuant to State law
EMPLOYERS' LIABILITY		\$2,000,000

Notwithstanding anything in this Facilities Lease to the contrary, the above insurance requirements may be modified as appropriate for subcontractors, with District's prior written approval.

15.2 District's Insurance

15.2.1 Rental Interruption Insurance

District shall at all times from and after District's **acceptance** of the Project, for the benefit of District and Developer, as their interests may appear, maintain rental interruption insurance to cover loss, total or partial, of the use of the Project due to damage or destruction, in an amount at least equal to the maximum estimated Lease Payments payable under this Facilities Lease during the current or any future twenty-four (24) month period. This insurance may be maintained as part of or in conjunction with any other insurance coverage carried by the District, and such insurance may be maintained in whole or in part in the form of participation by the District in a joint powers agency or other program providing pooled insurance. This insurance may not be maintained in the form of self-insurance.

15.2.2 Property Insurance

District shall at all times from and after District's acceptance of the Project, carry and maintain in force a policy of property insurance for 100% of the insurable replacement value with no coinsurance penalty, on the Project Site and the Project, together with all improvements thereon, under a standard "all risk" contract insuring against loss or damage. Developer shall be named as additional insureds or co-insureds thereon by way of endorsement. District shall have the right to procure the required insurance through a joint powers agency or to self-insure against such losses or portion thereof as is deemed prudent by District.

16. Indemnification and Defense

16.1 To the fullest extent permitted by California law, Developer shall indemnify, keep and hold harmless the District and its respective Board Members, the Architect(s) and Construction Manager(s), their respective consultants, separate contractors, board members, officers, representatives, agents, and employees, in both individual and official capacities ("Indemnitees"), against all suits, claims, injury, damages, losses, and expenses ("Claims"), including but not limited to attorney's fees and costs, caused by, arising out of, resulting from, or incidental to, in whole or in part, the performance of the Work under this Contract by the Developer or its Subcontractors, vendors and/or suppliers. However, the Contractor's indemnification and hold harmless obligation shall be reduced by the proportion of the Indemnitees' and/or Architect's liability to the extent the Claim(s) is/are caused wholly by the active negligence or willful misconduct of the Indemnitees, and/or defects in design furnished by the Architect, as found by a court or arbitrator of competent jurisdiction. This indemnification and hold harmless obligation of the Developer shall not be construed to negate, abridge, or otherwise reduce any right or obligation of indemnity that would otherwise exist or arise as to any Indemnitee or other person described herein. This indemnification and hold harmless obligation includes, but is not limited to, any failure or alleged failure by Developer to comply with any law and/or provision of the Contract Documents in strict accordance with their terms, and without limitation, any failure or alleged failure of Developers obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the DIR.

16.2 To the furthest extent permitted by California law, Developer shall also defend Indemnitees, at its own expense, including but not limited to attorneys' fees and costs, against all Claims caused by, arising out of, resulting from, or incidental to, in whole or in part, the performance of the Work under this Contract by the Developer, its Subcontractors, vendors, or suppliers. However, the Developer's defense obligation shall be reduced by the proportion of the Indemnitees' and/or Architect's liability to the extent caused by the sole negligence, active negligence, or willful misconduct of the Indemnitees, and/or defects in design furnished by the Architect, as found by a court or arbitrator of competent jurisdiction. The District shall have the right to accept or reject any legal representation that Developer proposes to defend the Indemnitees. If any Indemnitee provides its own defense due to failure to timely respond to tender of defense, rejection of tender of defense, or conflict of interest of proposed counsel, Contractor shall reimburse such Indemnitee for any expenditures. Developer's defense obligation shall not be construed to negate, abridge, or otherwise reduce any right or obligation of defense that would otherwise exist as to any Indemnitee or other person described herein. Developer's defense obligation includes, but is not limited to, any failure or alleged failure by Developer to comply with any provision of law, any failure or alleged failure to timely and properly fulfill all of its obligations under the Contract Documents in strict accordance with their terms, and without limitation, any failure or alleged failure of Developer's obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the DIR. Developer shall give prompt notice to the District in the event of any Claim(s).

16.3 Without limitation of the provisions herein, if the Developer's obligation to indemnify and hold harmless the Indemnitees or its obligation to defend Indemnitees as provided herein shall be determined to be void or unenforceable, in whole or in part, it is the intention of the Parties that these circumstances shall not otherwise affect the validity or enforceability of the Developer's agreement to indemnify, defend, and hold harmless the rest of the Indemnitees, as provided herein. Further, the Developer shall

be and remain fully liable on its agreements and obligations herein to the fullest extent permitted by law.

16.4 Pursuant to Public Contract Code section 9201, the District shall provide timely notification to Developer of the receipt of any third-party Claim relating to this Contract. The District shall be entitled to recover its reasonable costs incurred in providing said notification.

16.5 In any and all Claims against any of the Indemnitees by any employee of the Developer, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the Developer's indemnification obligation herein shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Developer or any Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

16.6 The District may retain so much of the moneys due to the Developer as shall be considered necessary, until disposition of any such Claims or until the District, Architect(s) and Construction Manager(s) have received written agreement from the Developer that Developer will unconditionally defend the District, the Architect(s) and Construction Manager(s), their respective officers, agents and employees, and pay any damages due by reason of settlement or judgment.

16.7 The Developer's defense and indemnification obligations hereunder shall survive the completion of Work, including the warranty/guarantee period, and/or the termination of the Contract.

17. Eminent Domain

17.1 Total Taking After Project Delivery

If, following delivery of possession of the Project by Developer to District, all of the Project and the Project Site is taken permanently under the power of eminent domain, the Term shall cease as of the day possession shall be so taken.

17.1.1 The financial interest of Developer shall be limited to the amount of principal payments pursuant to the GMP provisions indicated in **Exhibit C** that are then due or past due together with all remaining and succeeding principal payments pursuant to the GMP provisions indicated in **Exhibit C** for the remainder of the original Term. For example, if all of the Project and the Project Site is taken at the end of the third year of the Term, Developer shall be entitled to receive from the eminent domain award the sum of all principal payments pursuant to the GMP provisions indicated in **Exhibit C** that would have been owing for the fourth year through the end of the Term had there been no taking.

17.1.2 The balance of the award, if any, shall be paid to the District.

17.2 Total Taking Prior to Project Delivery

If all of the Project and the Project Site is taken permanently under the power of eminent domain and the Developer is still performing the work of the Project and has not yet delivered possession of the Project to District, the Term shall cease as of the day possession shall be so taken. The financial interest of Developer shall be the

amount Developer has expended to date for work performed on the Project, subject to documentation reasonably satisfactory to the District.

17.3 Partial Taking

If, following delivery of possession of the Project by Developer to District, less than all of the Project and the Project Site is taken permanently, or if all of the Project and the Project Site or any part thereof is taken temporarily, under the power of eminent domain.

17.3.1 This Facilities Lease shall continue in full force and effect and shall not be terminated by virtue of that partial taking and the Parties waive the benefit of any law to the contrary, and

17.3.2 There shall be a partial abatement of any principal payments pursuant to the GMP provisions indicated in **Exhibit C** as a result of the application of the net proceeds of any eminent domain award to the prepayment of those payments hereunder. The Parties agree to negotiate, in good faith, for an equitable split of the net proceeds of any eminent domain award and a corresponding reduction in the payments required pursuant to the GMP provisions indicated in **Exhibit C**.

18. Damage and Destruction

If, following delivery of possession of all or a portion of the Project by Developer to District, the Project is totally or partially destroyed due to fire, acts of vandalism, flood, storm, earthquake, Acts of God, or other casualty beyond the control of either party hereto, the Term shall end and District shall no longer be required to make any payments required pursuant to the GMP provisions indicated in **Exhibit C** that are then due or past due or any remaining and succeeding principal payments pursuant to the GMP provisions indicated in **Exhibit C** for the remainder of the original Term.

19. Abatement

19.1 If, after the Parties have executed the Memorandum of Commencement Date attached hereto as **Exhibit E**, the Project becomes destroyed or damaged beyond repair, the District may determine its use of the Project abated. Thereafter, the District shall have no obligation to make, nor shall the Developer have the right to demand, the Lease Payments as indicated in the GMP provisions indicated in **Exhibit C** to this Facilities Lease. The Term shall cease at that time.

19.2 The Parties hereby agree that the net proceeds of the District's rental interruption insurance that the District must maintain during the Term, as required herein, shall constitute a special fund for the payment of the Lease Payments indicated in the GMP provisions indicated in **Exhibit C**.

19.3 The District shall as soon as practicable after such event, apply the net proceeds of its insurance policy intended to cover that loss ("Net Proceeds"), either to:

19.3.1 Repair the Project to full use.

19.3.2 Replace the Project, at the District's sole cost and expense, with property of equal or greater value to the Project immediately prior to the time

of the destruction or damage, and that replacement, once completed, shall be substituted in this Facilities Lease by appropriate endorsement; or

19.3.3 Exercise the District's purchase option as indicated in the GMP provisions indicated in **Exhibit C** to this Facilities Lease.

19.4 The District shall notify the Developer of which course of action it desires to take within thirty (30) days after the occurrence of the destruction or damage. The Net Proceeds of all insurance payable with respect to the Project shall be available to the District and shall be used to discharge the District's obligations under this Section.

20. Access

20.1 By Developer

Developer shall have the right at all reasonable times to enter upon the Project Site to construct the Project pursuant to this Facilities Lease. Following the acceptance of the Project by District, Developer may enter the Project at reasonable times with advance notice and arrangement with District for purposes of making any repairs required to be made by Developer.

20.2 By District

The District shall have the right to enter upon the Project Site at all times. District shall comply with all safety precautions and procedures required by Developer.

21. Assignment, Subleasing

21.1 Assignment and Subleasing by the District

Any assignment or sublease by District shall be subject to all of the following conditions:

21.1.1 This Facilities Lease and the obligation of the District to make the payments required pursuant to the GMP provisions indicated in **Exhibit C** shall remain obligations of the District; and

21.1.2 The District shall, within thirty (30) days after the delivery thereof, furnish or cause to be furnished to Developer a true and complete copy of any assignment or sublease. **Assignment by Developer**

21.2 Developer may assign its right, title and interest in this Facilities Lease, in whole or in part to one or more assignees, only after the written consent of District, which District will not unreasonably withhold. No assignment shall be effective against the District unless and until the District has consented in writing. Notwithstanding anything to the contrary contained in this Facilities Lease, no consent from the District shall be required in connection with any assignment by Developer to a lender for purposes of financing the Project as long as there are not additional costs to the District.

22. Termination, Default And Suspension

22.1 Termination; Lease Terminable Only As Set Forth Herein

22.1.1 Except as otherwise expressly provided in this Facilities Lease, this Facilities Lease shall not terminate, nor shall District have any right to terminate this Facilities Lease or be entitled to the abatement of any necessary payments pursuant to the GMP provisions in **Exhibit C** or any reduction thereof. The obligations hereunder of District shall not be otherwise affected by reason of any damage to or destruction of all or any part of the Project; the taking of the Project or any portion thereof by condemnation or otherwise; the prohibition, limitation or restriction of District's use of the Project; the interference with such use by any private person or contractor; the District's acquisition of the ownership of the Project (other than pursuant to an express provision of this Facilities Lease); any present or future law to the contrary notwithstanding. It is the intention of the Parties hereto that all necessary payments pursuant to the GMP provisions indicated in **Exhibit C** shall continue to be payable in all events, and the obligations of the District hereunder shall continue unaffected unless the requirement to pay or perform the same shall be terminated or modified pursuant to an express provision of this Facilities Lease.

22.1.2 Nothing contained herein shall be deemed a waiver by the District of any rights that it may have to bring a separate action with respect to any Event of Default by Developer hereunder or under any other agreement to recover the costs and expenses associated with that action. The District covenants and agrees that it will remain obligated under this Facilities Lease in accordance with its terms.

22.1.3 Following completion of the Project, the District will not take any action to terminate, rescind or avoid this Facilities Lease, notwithstanding the bankruptcy, insolvency, reorganization, composition, readjustment, liquidation, dissolution, winding-up or other proceeding affecting Developer or any assignee of Developer in any such proceeding, and notwithstanding any action with respect to this Facilities Lease which may be taken by any trustee or receiver of Developer or of any assignee of Developer in any such proceeding or by any court in any such proceeding. Following completion of the Project, except as otherwise expressly provided in this Facilities Lease, District waives all rights now or hereafter conferred by law to quit, terminate or surrender this Facilities Lease or the Project or any part thereof.

22.1.4 District acknowledges that Developer may assign an interest in some or all of the necessary payments pursuant to the GMP provisions indicated in **Exhibit C** to a lender in order to obtain financing for the cost of constructing the Project and that the lender may rely on the foregoing covenants and provisions in connection with such financing.

22.2 District's Right to Terminate Developer for Cause

22.2.1 Grounds for Termination

The District, in its sole discretion, without prejudice to any other right or remedy, may terminate the Site Lease and Facilities Lease and/or terminate the Developer's right to perform the work of the Facilities Lease based upon any of the following:

22.2.1.1 Developer refuses or fails to execute the Work or any separable part thereof; or

22.2.1.2 Developer fails to complete said Work within the time specified or any extension thereof; or

22.2.1.3 Developer persistently fails or refused to perform Work or provide material of sufficient quality as to be in compliance with the Facilities Lease; or

22.2.1.4 Prior to completion of the Project, Developer is adjudged a bankrupt, files a petition for relief as a debtor, or a petition is filed against the Developer without its consent, and the petition not dismissed within sixty (60) days; or

22.2.1.5 Prior to the completion of the Project, Developer makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency; or

22.2.1.6 Developer persistently or repeatedly refuses and/or fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials to complete the Work in the time specified; or

22.2.1.7 Developer fails to make prompt payment to Subcontractors, or for material, or for labor; or

22.2.1.8 Developer persistently disregards laws, or ordinances, or instructions of District as indicated in **Exhibit D**, or otherwise in violation of **Exhibit D**; or

22.2.1.9 Developer fails to supply labor, including that of Subcontractors, that is sufficient to prosecute the Work or that can work in harmony with all other elements of labor employed or to be employed on the Work; or

22.2.1.10 Developer or its Subcontractor(s) is/are otherwise in breach, default, or in substantial violation of any provision of this Facilities Lease, including but not limited to a lapse in licensing or registration.

22.2.2 Notification of Termination

22.2.2.1 Upon the occurrence at District's sole determination of any of the above conditions, or upon Developer's failure to perform any material covenant, condition or agreement in this Facilities Lease, District may, without prejudice to any other right or remedy, serve written notice upon Developer and its Surety of District's termination of this Facilities Lease and/or the Developer's right to perform the work of this Facilities Lease. This notice will contain the reasons for termination.

22.2.2.1.1 Unless, within fifteen (15) days after the service of the notice, any and all condition(s) shall cease, and any and all violation(s) shall cease, or arrangement satisfactory to District for the correction of the

condition(s) and/or violation(s) be made, this Facilities Lease and the Site Lease shall cease and terminate.

22.2.2.1.2 If the failure stated in the notice cannot be corrected within fifteen (15) days after the service of notice, District may consent to an extension of time, provided Developer instituted and diligently pursued corrective action within the applicable fifteen (15)-day period and until the violation is corrected. Upon District determination, Developer shall not be entitled to receive any further payment until the entire Work is finished.

22.2.2.2 Upon Termination, District may immediately serve written notice of tender upon Surety whereby Surety shall have the right to take over and perform this Facilities Lease only if Surety:

22.2.2.2.1 Within three (3) days after service upon it of the notice of tender, gives District written notice of Surety's intention to take over and perform this Facilities Lease; and

22.2.2.2.2 Commences performance of this Facilities Lease within three (3) days from date of serving of its notice to District.

22.2.2.3 Surety shall not utilize Developer in completing the Project if the District notifies Surety of the District's objection to Developer's further participation in the completion of the Project. Surety expressly agrees that any developer which Surety proposes to fulfill Surety's obligations is subject to District's approval.

22.2.2.4 If Surety fails to notify District or begin performance as indicated herein, District may take over the Work and execute the Work to completion by any method it may deem advisable at the expense of Developer and/or its Surety. Developer and its Surety shall be liable to District for any excess cost or other damages the District incurs thereby. Time is of the essence in this Facilities Lease. If the District takes over the Work as herein provided, District may, without liability for so doing, take possession of and utilize in completing the Work all materials, appliances, plan, and other property belonging to Developer as may be on the Site of the Work, in bonded storage, or previously paid for.

22.2.3 Effect of Termination

22.2.3.1 If District terminates the Site Lease and the Facilities Lease pursuant to this section, the Project Site and any improvements built upon the Project Site shall vest in District upon termination of the Site Lease and Facilities Lease, and District shall thereafter be required to pay only the principal amounts then due and owing pursuant to the GMP provisions indicated in **Exhibit C**, less any damages incurred by District due to Developer's default, acts, or omissions.

22.2.3.2 The District shall retain all rights it possesses pursuant to this Facilities Lease including, without limitation.

22.2.3.2.1 The right to assess liquidated damages due because of any project delay; and

22.2.3.2.2 All rights the District holds to demand performance pursuant to the Developer's required performance bond.

22.2.3.3 Developer shall, only if ordered to do so by the District, immediately remove from the Site all or any materials and personal property belonging to Developer that have not been incorporated in the construction of the Work, or which are not in place in the Work. The District retains the right, but not the obligation, to keep and use any materials and personal property belonging to Developer that have not been incorporated in the construction of the Work, or which are not in place in the Work. The Developer and its Surety shall be liable upon the performance bond for all damages caused the District by reason of the Developer's failure to complete the Work under this Facilities Lease.

22.2.3.4 In the event that the District shall perform any portion of, or the whole of the Work, pursuant to the provisions of the General Conditions, the District shall not be liable nor account to the Developer in any way for the time within which, or the manner in which, the Work is performed by the District or for any changes the District may make in the Work or for the money expended by the District in satisfying claims and/or suits and/or other obligations in connection with the Work.

22.2.3.5 In the event that the Site Lease and Facilities Lease are terminated for any reason, no allowances or compensation will be granted for the loss of any anticipated profit by the Developer or any impact or impairment of Developer's bonding capacity.

22.2.3.6 If the expense to the District to finish the Work exceeds the unpaid Guaranteed Maximum Price, Developer and Surety shall pay difference to District within twenty-one (21) days of District's request. District may apply any amounts otherwise due to Developer to this difference.

22.2.3.7 The District shall have the right (but shall have no obligation) to assume and/or assign to a replacement contractor or construction manager, or other third party who is qualified and has sufficient resources to complete the Work, the rights of the Developer under its subcontracts with any or all Subcontractors. In the event of an assumption or assignment by the District, no Subcontractor shall have any claim against the District or third party for Work performed by Subcontractor or other matters arising prior to termination of the Facilities Lease. The District or any third party, as the case may be, shall be liable only for obligations to the Subcontractor arising after assumption or assignment. Should the

District so elect, the Developer shall execute and deliver all documents and take all steps, including the legal assignment of its contractual rights, as the District may require, for the purpose of fully vesting in the District the rights and benefits of its Subcontractors under Subcontracts or other obligations or commitments. Developer must include this assignment provision in all of its Facilities Leases with its Subcontractors.

22.2.3.8 All payments due the Developer hereunder shall be subject to a right of offset by the District for expenses, damages, losses, costs, claims, or reimbursements suffered by, or due to, the District as a result of any default, acts, or omissions of the Developer.

22.2.3.9 The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to District.

22.3 Termination of Developer for Convenience

22.3.1 District in its sole discretion may terminate the Facilities Lease upon five (5) days written notice to the Developer. Under a termination for convenience, the District retains the right to all the options available to the District if there is a termination for cause. In case of a termination for convenience, the Developer shall have no claims against the District except:

22.3.1.1 The actual cost for labor, materials, and services performed that is unpaid and adequately documented through timesheets, invoices, receipts, or otherwise; and

22.3.1.2 Five percent (5%) of the total cost of work performed as of the date of termination, or five percent (5%) of the value of the Work yet to be performed, whichever is less. This five percent (5%) amount shall be full compensation for all Developer's and its Subcontractor(s)' mobilization and/or demobilization costs and any anticipated lost profits resulting from termination of the Developer for convenience.

22.4 Developer Remedies Upon District Default

22.4.1 Events of Default by District Defined

The following shall be "Events of Default" of the District under this Facilities Lease. The terms "Event of Default" and "Default," whenever they are used as to the District in the Site Lease or this Facilities Lease, shall only mean one or more of the following events:

22.4.1.1 Failure by the District to pay payments required pursuant to the GMP provisions in **Exhibit C**, and the continuation of this failure for a period of forty-five (45) days.

22.4.1.2 Failure by the District to perform any material covenant, condition or agreement in this Facilities Lease and that failure continues for a period of forty-five (45) days after Developer

provides District with written notice specifying that failure and requesting that the failure be remedied; provided, however, if the failure stated in the notice cannot be corrected within the applicable period, Developer shall not withhold its consent to an extension of time if corrective action is instituted by the District within the applicable period and diligently pursued until the default is corrected.

22.4.2 Remedies on District's Default

If there has been an Event of Default on the District's part, the Developer may exercise any and all remedies granted pursuant to this Facilities Lease; provided, however, there shall be no right under any circumstances to accelerate any of the payments required pursuant to the GMP provisions in **Exhibit C** or otherwise declare those payments not then past due to be immediately due and payable.

22.4.2.1 Developer may rescind its leaseback of the Project Site to the District under this Facilities Lease and re-rent the Project Site to another lessee for the remaining Term for no less than the fair market value for leasing the Project Site, which shall be:

22.4.2.1.1 An amount determined by a mutually-agreed upon appraiser; or

22.4.2.1.2 If an appraiser cannot be agreed to, an amount equal to the mean between a District appraisal and a Developer appraisal for the Project Site, both prepared by MAI-certified appraisers.

22.4.2.2 District's obligation to make the payments required pursuant to the GMP provisions indicated in **Exhibit C** shall be:

22.4.2.2.1 Increased by the amount of costs, expenses, and damages incurred by the Developer in re-renting the Project Site; and

22.4.2.2.2 Decreased by the amount of rent Developer receives in re-letting the Project Site.

22.4.2.3 The District agrees that the terms of this Facilities Lease constitute full and sufficient notice of the right of Developer to re-rent the Project Site in the Event of Default without effecting a surrender of this Facilities Lease, and further agrees that no acts of Developer in re-renting as permitted herein shall constitute a surrender or termination of this Facilities Lease, but that, on the contrary, in the event of an Event of Default by the District the right to re-rent the Project Site shall vest in Developer as indicated herein.

22.4.3 District's Continuing Obligation

Unless there has been damage, destruction, a Taking, or the Developer has acted, failed to act, or is in default as indicated above providing District with the right to terminate for cause, the District shall continue to remain liable for

the payments required pursuant to the GMP provisions in **Exhibit C** and those amounts shall be payable to Developer at the time and in the manner therein provided.

22.4.4 No Remedy Exclusive

No remedy herein conferred upon or reserved to Developer is intended to be exclusive and every such remedy shall be cumulative and shall be in addition to every other remedy given under this Facilities Lease or now or hereafter existing at law or in equity. No delay or omission to exercise any right or power accruing upon any Default shall impair any such right or power or shall be construed to be a waiver thereof, but any such right and power may be exercised from time to time and as often as may be deemed expedient. In order to entitle Developer to exercise any remedy reserved to it in this article, it shall not be necessary to give any notice, other than such notice as may be required in this Article or by law.

22.5 Emergency Termination Pursuant to Public Contracts Act of 1949

22.5.1 This Facilities Lease is subject to termination as provided by sections 4410 and 4411 of the Government Code of the State of California, being a portion of the Emergency Termination of Public Contracts Act of 1949.

22.5.1.1 Section 4410 of the Government Code states:

In the event a national emergency occurs, and public work, being performed by contract, is stopped, directly or indirectly, because of the freezing or diversion of materials, equipment or labor, as the result of an order or a proclamation of the President of the United States, or of an order of any federal authority, and the circumstances or conditions are such that it is impracticable within a reasonable time to proceed with a substantial portion of the work, then the public agency and the contractor may, by written agreement, terminate said contract.

22.5.1.2 Section 4411 of the Government Code states:

Such an agreement shall include the terms and conditions of the termination of the contract and provision for the payment of compensation or money, if any, which either party shall pay to the other or any other person, under the facts and circumstances in the case.

22.5.2 Compensation to the Developer shall be determined at the sole discretion of District on the basis of the reasonable value of the Work done, including preparatory work. As an exception to the foregoing and at the District's discretion, in the case of any fully completed separate item or portion of the Work for which there is a separate previously submitted unit price or item on the accepted schedule of values, that price may control. The District, at its sole discretion, may adopt the Schedule of Values Price as the value of the work done or any portion thereof.

22.6 Suspension of Work

22.6.1 District in its sole discretion may suspend, delay or interrupt the Work in whole or in part for such period of time as the District may determine upon three (3) days written notice to the Developer.

22.6.1.1 An adjustment may be made for changes in the cost of performance of the Work caused by any suspension, delay or interruption. No adjustment shall be made to the extent:

22.6.1.1.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which Developer is responsible; or

22.6.1.1.2 That an equitable adjustment is made or denied under another provision of the Site Lease or the Facilities Lease; or

22.6.1.1.3 That the suspension of Work was the direct or indirect result of Developer's failure to perform any of its obligations hereunder.

23.1.1.1 Any adjustments in cost of performance may have a fixed or percentage fee as provided in the section on Format for Proposed Change Order in **Exhibit D**. This amount shall be full compensation for all Developer's and its Subcontractor(s)' changes in the cost of performance of the Facilities Lease caused by any such suspension, delay or interruption.

23. Notices

All notices, certificates or other communications hereunder shall be sufficiently given and shall be deemed to have been received five (5) days after deposit in the United States mail in registered or certified form with postage fully prepaid or one (1) business day after deposit with an overnight delivery service with proof of actual delivery:

If to District:

Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376
Attn: Jaime Quintana

If to Developer:

[Developer]
[Address]
Attn: [Name, Title]

With a copy to:

Deidree Sakai, Esq.
Dannis Woliver Kelley
275 Battery Street, Suite 1150
San Francisco, CA 94111

Developer and District, by notice given hereunder, may designate different addresses to which subsequent notices, certificates or other communications will be sent.

24. Binding Effect

This Facilities Lease shall inure to the benefit of and shall be binding upon Developer and the District and their respective successors, transferees and assigns.

25. No Additional Waiver Implied by One Waiver

In the event any agreement contained in this Facilities Lease should be breached by either party and thereafter waived by the other party, such waiver shall be limited to the particular breach so waived and shall not be deemed to waive any other breach hereunder.

26. Severability

In the event any provision of this Facilities Lease shall be held invalid or unenforceable by any court of competent jurisdiction, that holding shall not invalidate or render unenforceable any other provision hereof, unless elimination of the invalid provision materially alters the rights and obligations embodied in this Facilities Lease or the Site Lease.

27. Amendments, Changes and Modifications

Except as to the termination rights of both Parties as indicated herein, this Facilities Lease may not be amended, changed, modified, altered or terminated without the written agreement of both Parties hereto.

28. Net-Net-Net Lease

This Facilities Lease shall be deemed and construed to be a "net-net-net lease" and the District hereby agrees that all payments it makes pursuant to the GMP provisions in **Exhibit C** shall be an absolute net return to Developer, free and clear of any expenses, charges or set-offs.

29. Execution in Counterparts

This Facilities Lease may be executed in several counterparts, each of which shall be an original and all of which shall constitute one and the same instrument.

30. Developer and District Representatives

Whenever under the provisions of this Facilities Lease the approval of Developer or the District is required, or Developer or the District is required to take some action at the request of the other, the approval or request shall be given for Developer by Developer's Representative and for the District by the District's Representative, and any party hereto shall be authorized to rely upon any such approval or request.

31. Applicable Law

This Facilities Lease shall be governed by and construed in accordance with the laws of the State of California, and venued in the County within which the School Site is located.

32. Attorney's Fees

If either party brings an action or proceeding involving the Property or to enforce the terms of this Facilities Lease or to declare rights hereunder, each party shall bear the cost of its own attorneys' fees.

33. Captions

The captions or headings in this Facilities Lease are for convenience only and in no way define, limit or describe the scope or intent of any provisions or sections of this Facilities Lease.

34. Prior Agreements

This Facilities Lease and the corresponding Site Lease collectively contain all of the agreements of the Parties hereto with respect to any matter covered or mentioned in this Facilities Lease and no prior agreements or understanding pertaining to any matter shall be effective for any purpose.

35. Further Assurances

Parties shall promptly execute and deliver all documents and instruments reasonably requested to give effect to the provisions of this Facilities Lease.

36. Recitals and Exhibits Incorporated

The Recitals set forth at the beginning of this Facilities Lease and the attached Exhibits are hereby incorporated into its terms and provisions by this reference.

37. Time of the Essence

Time is of the essence with respect to each of the terms, covenants, and conditions of this Facilities Lease.

38. Force Majeure

A party shall be excused from the performance of any obligation imposed in this Facilities Lease and the exhibits hereto for any period and to the extent that a party is prevented from performing that obligation, in whole or in part, as a result of delays caused by the other party or third parties, a governmental agency or entity, an act of God, war, terrorism, civil disturbance, forces of nature, fire, flood, earthquake, strikes or lockouts, and that non-performance will not be a default hereunder or a grounds for termination of this Facilities Lease.

39. Interpretation

None of the Parties hereto, nor their respective counsel, shall be deemed the drafters of this Facilities Lease for purposes of construing the provisions thereof. The language in all parts

of this Facilities Lease shall in all cases be construed according to its fair meaning, not strictly for or against any of the Parties hereto.

IN WITNESS WHEREOF, the Parties have caused this Facilities Lease to be executed by their respective officers who are duly authorized, as of the Effective Date.

ACCEPTED AND AGREED on the date indicated below:

Dated: _____, 2024

Dated: _____, 2024

Tracy Unified School District

[Developer]

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

EXHIBIT A

LEGAL DESCRIPTION OF SCHOOL SITE

West High School
1775 West Lowell Avenue
Tracy, CA 95376
Project#232-13-010

Lot, according to the Official Maps or Plat thereof, filed for record in Volume of Maps and Plats, Page , County Records.

EXHIBIT B

DESCRIPTION OF PROJECT SITE

Attached is a map or diagram of the School Site that is subject to this Facilities Lease and upon which Developer will construct the Project.



EXHIBIT C

**GUARANTEED MAXIMUM PRICE AND
OTHER PROJECT COST, FUNDING, AND PAYMENT PROVISIONS**

Attached are the terms and provisions related to Site Lease payments, the Facilities Lease, the Guaranteed Maximum Price and other related cost, funding, and payment provisions.

EXHIBIT D

GENERAL CONSTRUCTION PROVISIONS

Attached are the general construction terms and conditions for the Project.

EXHIBIT D-1

SPECIAL CONDITIONS

Attached are the special terms and conditions for the Project.

EXHIBIT E

MEMORANDUM OF COMMENCEMENT DATE

This MEMORANDUM OF COMMENCEMENT DATE is dated _____, 2024, and is made by and between _____ ("Developer"), as Lessor, and Tracy Unified School District ("District"), as Lessee.

1. Developer and District have previously entered into a Facilities Lease dated as of _____, 2024, (the "Lease") for the leasing by Developer to District of the Project Site and Project in Tracy, California, referenced in the Lease.

2. District hereby confirms the following:

A. That all construction of the Project required to be performed pursuant to the Facilities Lease has been completed by Developer in all respects;

B. That District has accepted and entered into possession of the Project and now occupies same; and

C. That the term for the Lease Payments under the Facilities Lease commenced on _____, 2024 and will expire at 11:59 P.M. on _____, 2024.

THIS MEMORANDUM OF COMMENCEMENT DATE IS ACCEPTED AND AGREED on the date indicated below:

Dated: _____, 2024

Dated: _____, 2024

Tracy Unified School District

[Developer]

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

EXHIBIT F

CONSTRUCTION SCHEDULE

Attached is a detailed Project Construction Schedule with a duration no longer than the Contract Time, and with specific milestones that Developer shall meet.

[To Be Attached.]

EXHIBIT G

SCHEDULE OF VALUES

Attached is a detailed Schedule of Values that complies with the requirements of the Construction Provisions (Exhibit "D") and that has been approved by the District.

[To Be Attached.]

EXHIBIT C

GUARANTEED MAXIMUM PRICE AND OTHER PROJECT COST, FUNDING, AND PAYMENT PROVISIONS

1. Site Lease Payments

As indicated in the Site Lease, Developer shall pay One Dollar (\$1.00) to the District as consideration for the Site Lease.

2. Guaranteed Maximum Price

Pursuant to the Facilities Lease, Developer will cause the Project to be constructed for an amount to be determined after the Division of the State Architect ("DSA") approves the plans and specification for all phases of the Project ("Guaranteed Maximum Price").

2.1 Cost of the Work

The term Cost of the Work shall mean the costs necessarily incurred in the proper performance of the Work contemplated by the Contract Documents. Such costs shall be at rates no higher than the standard paid at the place of the Project except with the prior consent of the District. The Cost of the Work shall include only the items set forth in this Section 2 and approved by the District.

2.1.1 General Conditions

The General Conditions as set forth in **Attachment 1** hereto shall be included in a progress billing as incurred. Said rates shall include all costs for labor, equipment and materials for the items identified therein which are necessary for the proper management of the Project, and shall include all costs paid or incurred by the Developer for insurance, permits, taxes, and all contributions, assessments and benefits, holidays, vacations, retirement benefits, incentives to the extent contemplated in **Attachment 1**, whether required by law or collective bargaining agreements or otherwise paid or provided by Developer to its employees. The District reserves the right to request changes to the personnel, equipment, or facilities provided as General Conditions as may be necessary or appropriate for the proper management of the Project, in which case, the District shall be entitled to a reduction in the cost of General Conditions based on the rates set forth in **Attachment 1**.

2.1.2 Subcontract Costs

Payments made by the Developer to Subcontractors (inclusive of the Subcontractor's bonding, if required, and insurance costs, which shall be included in the subcontract amount), which payments shall be made in accordance with the requirements of the Contract Documents.

2.1.3 Developer-Performed Work

Costs incurred by the Developer for self-performed work at the direction of District or with the District's prior approval, as follows:

2.1.3.1 Actual costs to the Developer of wages of construction workers, excluding all salaried and/or administrative personnel, directly

employed by the Developer to perform the construction of the Work at the site.

2.1.3.2 Wages or salaries and customary benefits, such as sick leave, medical and health benefits, holidays, vacations, incentive programs, and pension plans of the Developer's field supervisory, safety and administrative personnel when stationed at the site or stationed at the Developer's principal office, only for that portion of their time required for the Work.

2.1.3.3 Wages and salaries and customary benefits, such as sick leave, medical and health benefits, holidays, vacations, incentive programs and pension plans of the Developer's supervisory or administrative personnel engaged at factories, workshops or on the road, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of their time required for the Work.

2.1.3.4 Costs paid or incurred by Developer for taxes, insurance, contributions, assessments required by law or collective bargaining agreements and for personnel not covered by such agreements, and for customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, provided such costs are based on wages and salaries included in the Cost of the Work under Subparagraphs 2.1.3.1 through 2.1.3.3.

2.1.3.5 Costs, including transportation and storage, of materials and equipment incorporated in the completed construction, including costs of materials in excess of those actually installed to allow for reasonable waste and spoilage. Unused excess materials, if any, shall become the District's property at the completion of the Work or, at the District's option, shall be sold by the Developer. Any amounts realized from such sales shall be credited to the District as a deduction from the Cost of the Work.

2.1.3.6 Costs, including transportation and storage, installation, maintenance, dismantling and removal of materials, supplies, machinery and equipment not customarily owned by construction workers, that are provided by the Developer at the site and fully consumed in the performance of the Work; and cost (less salvage value) of such items if not fully consumed, whether sold to others or retained by the Developer. Cost for items previously used by the Developer shall mean fair market value.

2.1.3.7 Rental charges for temporary facilities, machinery, equipment, vehicles and vehicle expenses, and hand tools not customarily owned by construction workers that are provided by the Developer at the site, whether rented from the Developer or others, and the costs of transportation, installation, minor repairs and replacements, dismantling and removal thereof and costs of Developer's Project field office, overhead and general expenses including office supplies, parking, office equipment, and software. Rates and quantities of equipment rented shall be subject to the District's prior approval.

2.1.3.8 Costs of removal of debris from the site, daily clean-up costs and dumpster charges not otherwise included in the cost of the subcontracts which exceeds the clean-up provided under the General Conditions.

2.1.3.9 Costs of that portion of the reasonable travel, parking and subsistence expenses of the Developer's personnel incurred while traveling and discharging duties connected with the Work.

2.1.3.10 Costs of materials and equipment suitably stored off the site at a mutually acceptable location, if approved in advance by the District.

2.1.4 Allowances

Because it is impossible at the time of execution of the Facilities Lease to determine the exact cost of performing certain tasks, the Cost of the Work shall include the following Allowances for the Tasks/Work as noted here:

Task/Work	Allowance Amount
Total Allowance Amount	

The District shall have sole discretion to authorize all expenditures from the Allowances. The District shall process expenditures from the Allowances in the form of an Allowance Expenditure Directive ("AED"). The Allowances are included in the Guaranteed Maximum Price. Any unused Allowance or unused portion thereof shall be deducted from the Cost of the Work pursuant to **Exhibit D** to this Facilities Lease to the benefit of the District.

2.1.5 Excluded Costs

The following items are considered general overhead items and shall not be billed to the District:

2.1.5.1 Salaries and other compensation of the Developer's personnel stationed at Developer's principal office or offices other than the Project Field Office, except as specifically provided in Subparagraphs 2.1.3.2. and 2.1.3.4.

2.1.5.2 Expenses of the Developer's principal office and offices other than the Project Field Office.

2.1.5.3 Overhead and general expenses, except as may be expressly included in this Section 2.

2.1.5.4 The Developer's capital expenses, including interest on the Developer's capital employed for the Work.

2.1.5.5 Costs that would cause the any Phase GMP or Guaranteed Maximum Price (as adjusted by Change Order) to be exceeded.

2.1.6 Developer's Fee

_____ percent (____%) of the Cost of the Work as described in Section 2.1.

2.1.7 Bonds and Insurance

For insurance and bonds required under this Facilities Lease (exclusive of those required by Subcontractors, which costs are included in the subcontract amounts), that portion of insurance and bond premiums which are directly attributable to this Contract, which shall be calculated at a rate of percent (____%) of the Cost of the Work for insurance and _____ percent (____%) of the Cost of the Work for payment and performance bonds.

2.1.8 Contingency

2.1.8.1 The Guaranteed Maximum Price includes a Contingency of Ten percent (10 %) of the Cost of the Work as described in Section 2.1.1, 2.1.2, and 2.1.3 for potential additional construction costs for unforeseen conditions that occur over the course of construction and/or scope gaps between the subcontract categories of the Work.

2.1.8.2 The Contingency is not intended for such things as scope changes.

2.1.8.3 The Contingency shall not be used without the agreement of the District.

2.1.8.4 The unused portion of the Contingency shall be considered as cost savings and retained by the District at the end of the Project.

2.2 The Guaranteed Maximum Price will consist of the amounts to be identified in **Attachment 2** to this **Exhibit C**. Except as indicated herein for modifications to the Project approved by the District, Developer will not seek additional compensation from District in excess of Guaranteed Maximum Price. District shall pay the Guaranteed Maximum Price to Developer in the form of Tenant Improvement Payments and Lease Payments as indicated herein.

2.3 Total Payment

In no event shall the cumulative total of the Tenant Improvement Payments and the Lease Payments ever exceed the Guaranteed Maximum Price to be defined, as may be modified pursuant to **Exhibit D** to the Facilities Lease.

2.4 Changes to Guaranteed Maximum Price

2.4.1 The Parties acknowledge that the Guaranteed Maximum Price, including all Phase GMPs, is based on the Construction Documents, including the plans and specifications, as identified in **Exhibit D** to the Facilities Lease.

2.4.2 As indicated in the Facilities Lease, the Parties may add to or remove from the project specific scopes of work. Based on these change(s), the Parties may agree to a reduction or increase in the Guaranteed Maximum Price, or any Phase GMPs. If a cost impact of a change is agreed to by the Parties, it shall be paid upon the payment request from the Developer for the work that is the subject of the change in accordance with the provisions of **Exhibit D**. The amount of any change to the Guaranteed Maximum Price and/or Phase GMP shall be calculated in accordance with the provisions of **Exhibit D** to this Facilities Lease.

2.4.3 The Parties agree to reduce the Guaranteed Maximum Price for the unused portion of the Developer Contingency, if any.

2.4.4 Cost Savings

Developer shall work cooperatively with Architect, Construction Manager, subcontractors and District, in good faith, to identify appropriate opportunities to reduce the Project costs and promote cost savings. Any identified cost savings from the Guaranteed Maximum Price shall be identified by Developer, and approved in writing by the District. In the event Developer realizes a savings on any aspect of the Project, such savings shall be added to the Contingency and expended consistent with the Contingency. In addition, any portion of Allowance remaining after completion of the Project shall be added to the Contingency. If any cost savings require revisions to the Construction Documents, Developer shall work with the District and Architect with respect to revising the Construction Documents and, if necessary, obtaining the approval of DSA with respect to those revisions. Developer shall be entitled to an adjustment of Contract Time for delay in completion caused by any cost savings adopted by District pursuant to **Exhibit D**, if requested in writing before the approval of the cost savings.

2.4.5 If the District exercises its Purchase Option pursuant to this **Exhibit C**, any reduction in the Guaranteed Maximum Price resulting from that exercise of the Purchase Option, if any, shall be retained in full by the District and shall not be shared with the Developer.

3. Tenant Improvement Payments

Prior to the District's taking delivery or occupancy of the Project, the District shall pay to Developer an amount equal to the Guaranteed Maximum Price as modified pursuant to the terms of the Facilities Lease, including **Exhibit C** and **Exhibit D**, less the Lease Payments ("Tenant Improvement Payments"). The District shall withhold an amount equal to one-third (1/3) of the Loan Amount as indicated in **Attachment 3** to **Exhibit C** from the last three(3) payments to Developer for its Work on the Project. Otherwise, the Tenant Improvement Payments will be processed based on the amount of Work performed according to the Developer's Schedule of Values (**Exhibit G** to the Facilities Lease) and pursuant to the provisions in **Exhibit D** to the Facilities Lease, including withholding for or escrow of retention of five percent (5%) of the Guaranteed Maximum Price. The withholding for the Loan Amount shall be separate form and in addition to withholding for or escrow of retention.

4. Lease Payments

Upon execution of the Memorandum of Commencement Date, the form of which is attached to the Facilities Lease as **Exhibit E**, the District shall commence making lease payments to Developer in accordance with the Schedule attached hereto as **Attachment 3**.

4.1 The Lease Payments shall be consideration for the District's rental, use, and occupancy of the Project and the Project Site and shall be made in monthly installments as indicated in the Schedule of Lease Payments attached hereto as **Attachment 3** for the duration of the lease term of one (1) year, with the first Lease Payment due ninety (90) days after execution of the Memorandum of Commencement Date.

4.2 The District represents that the annual Lease Payment obligation does not surpass the District's annual budget and will not require the District to increase or impose additional taxes or obligations on the public that did not exist prior to the execution of the Facilities Lease.

4.3 Fair Rental Value

District and Developer have agreed and determined that the total Lease Payments constitute adequate consideration for the Facilities Lease and are reasonably equivalent to the fair rental value of the Project. In making such determination, consideration has been given to the obligations of the Parties under the Facilities Lease and Site Lease, the uses and purposes which may be served by the Project and the benefits therefrom which will accrue to the District and the general public.

4.4 Each Lease Payment Constitutes a Current Expense of the District

4.4.1 The District and Developer understand and intend that the obligation of the District to pay Lease Payments and other payments hereunder constitutes a current expense of the District and shall not in any way be construed to be a debt of the District in contravention of any applicable constitutional or statutory limitation or requirement concerning the creation of indebtedness by the District, nor shall anything contained herein constitute a pledge of the general tax revenues, funds or moneys of the District.

4.4.2 Lease Payments due hereunder shall be payable only from current funds which are budgeted and appropriated or otherwise made legally available for this purpose. This Facilities Lease shall not create an immediate indebtedness for any aggregate payments that may become due hereunder.

4.4.3 The District covenants to take all necessary actions to include the Lease Payments in each of its final approved annual budgets.

4.4.4 The District further covenants to make all necessary appropriations (including any supplemental appropriations) from any source of legally available funds of the District for the actual amount of Lease Payments that come due and payable during the period covered by each such budget. Developer acknowledges that the District has not pledged the full faith and credit of the District, State of California or any state agency or state department to the payment of Lease Payments or any other payments due hereunder. The covenants on the part of District contained in this Facilities Lease constitute duties imposed by law and it shall be the duty of each and every public official of the District to take such action and do such things as are required by law in the performance of the official duty of such officials to enable the District to carry out and perform the covenants and agreements in this Facilities Lease agreed to be carried out and performed by the District.

4.4.5 The Developer cannot, under any circumstances, accelerate the District's payments under the Facilities Lease.

5. District's Purchase Option

5.1 If the District is not then in uncured Default hereunder, the District shall have the option to purchase not less than all of the Project in its "as-is, where-is" condition and terminate this Facilities Lease and Site Lease by paying the balance of the "Loan Amount" identified in **Attachment 3**, which is exclusive of interest that would have otherwise been owed, as of the date the option is exercised ("Option Price"). Said payment shall be made on or before the date on which the District's lease payment would otherwise be due for that month ("Option Date").

5.2 District shall provide to Developer a written notice no less than ten (10) days prior to the Option Date. The notice will include that District is exercising its option to purchase the Project as set forth above on the Option Date. If the District exercises this option, the District shall pay directly to Developer the Option Price on or prior to the Option Date and Developer shall at that time deliver to District an executed Termination Agreement and Quitclaim Deed in recordable form to terminate this Facilities Lease and the Site Lease. District may record all such documents at District's cost and expense.

5.3 Under no circumstances can the first Option Date be on or before ninety (90) days after the Developer completes the Project and the District accepts the Project.

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ATTACHMENT 1
GENERAL CONDITIONS COSTS

To be attached.

ATTACHMENT 2
GUARANTEED MAXIMUM PRICE

To be attached.

ATTACHMENT 3
SCHEDULE OF LEASE PAYMENTS

Amortization Schedule

Loan Amount: \$
Interest: 2.00% Annual
 12.00
Payment
Frequency Monthly

<u>Payment #</u>	<u>Total Payment</u>	<u>Principal Payment</u>	<u>Interest Payment</u>	<u>Balance</u>
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Totals				

EXHIBIT D

**GENERAL CONSTRUCTION PROVISIONS
FOR THE FOLLOWING PROJECT:**

**WEST HIGH SCHOOL
ADDITION
PROJECT #2024/25-007**

BY AND BETWEEN

TRACY UNIFIED SCHOOL DISTRICT

AND

[DEVELOPER]

Dated as of _____, 2024

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1. **Contract Terms and Definitions**

1.1 **Definitions**

Wherever used in the Contract Documents, the following terms shall have the meanings indicated, which shall be applicable to both the singular and plural thereof:

1.1.1 Adverse Weather. Shall be only weather that satisfies all of the following conditions: (1) unusually severe precipitation, sleet, snow, hail, or extreme temperature or air conditions in excess of the norm for the location and time of year it occurred based on the closest weather station data averaged over the past five years, (2) that is unanticipated and would cause unsafe work conditions and/or is unsuitable for scheduled work that should not be performed during inclement weather (i.e., exterior finishes), and (3) at the Project.

1.1.2 Allowance Expenditure Directive. Written authorization for expenditure of allowance, if any.

1.1.3 Approval, Approved, and/or Accepted. Written authorization, unless stated otherwise.

1.1.4 Architect (or "Design Professional in General Responsible Charge"). The individual, partnership, corporation, joint venture, or any combination thereof, named as Architect, who will have the rights and authority assigned to the Architect in the Contract Documents. The term Architect means the Design Professional in General Responsible Charge as defined in DSA PR 13-02 on this Project or the Architect's authorized representative.

1.1.5 As-Builts. Digitally prepared and reproducible drawings using the web-based ProCore application, or comparable, to be prepared on a monthly basis pursuant to the Contract Documents, that reflect changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed since the preceding monthly submittal. See **Record Drawings**.

1.1.6 Change Order. A written order to the Developer authorizing an addition to, deletion from, or revision in the Work, and/or authorizing an adjustment in the Guaranteed Maximum Price or Contract Time.

1.1.7 Claim. A Dispute that remains unresolved at the conclusion of all the applicable Dispute Resolution requirements provided herein.

1.1.8 Completion. The earliest of the date of acceptance by the District or the cessation of labor thereon for a continuous period of sixty (60) days.

1.1.9 Construction Change Directive. A written order prepared and issued by the District, the Construction Manager, and/or the Architect and signed by the District and the Architect, directing a change in the Work.

1.1.10 Construction Manager. The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Construction Manager is used on the

Project that is the subject of this Contract, then all references to Construction Manager herein shall be read to refer to District.

1.1.11 Construction Schedule. The progress schedule of construction of the Project as provided by Developer and approved by District.

1.1.12 Contract. The agreement between the District and Developer contained in the Contract Documents.

1.1.13 Contract Documents. The Contract Documents consist exclusively of the documents evidencing the agreement of the District and Developer. The Contract Documents consist of the following documents:

1.1.13.1 Non-Collusion Declaration

1.1.13.2 Iran Contracting Act Certification

1.1.13.3 Site Lease

1.1.13.4 Facilities Lease, including Exhibits A-H

1.1.13.4.1 Performance Bond

1.1.13.4.2 Payment Bond (Developer's Labor & Material Bond)

1.1.13.4.3 Registered Subcontractors List

1.1.13.4.4 Hazardous Materials Procedures and Requirements

1.1.13.4.5 Workers' Compensation Certification

1.1.13.4.6 Prevailing Wage Certification

1.1.13.4.7 Disabled Veterans Business Enterprise Participation Certification (if applicable)

1.1.13.4.8 Drug-Free Workplace Certification

1.1.13.4.9 Tobacco-Free Environment Certification

1.1.13.4.10 Hazardous Materials Certification

1.1.13.4.11 Lead-Based Materials Certification (if applicable)

1.1.13.4.12 Imported Materials Certification (if applicable)

1.1.13.4.13 Criminal Background Investigation/Fingerprinting Certification

1.1.13.4.14 Roofing Project Certification (if applicable)

1.1.13.4.15 Skilled and Trained Workforce Certification

1.1.13.4.16 Escrow Agreement for Security Deposits in Lieu of Retention (if used)

1.1.13.4.17 Guarantee Form

1.1.13.4.18 Agreement and Release of Any and All Claims

1.1.13.5 All Plans, Technical Specifications, and Drawings, including the Division of the State Architect approved versions of the foregoing

1.1.13.6 Any and all addenda to any of the above documents

1.1.13.7 Any and all change orders or written modifications to the above documents if approved in writing by the District

1.1.14 Contract Time. The time period stated in the Facilities Lease for the completion of the Work.

1.1.15 Daily Job Report(s). Daily Project reports prepared by the Developer's employee(s) who are present on Site, which shall include the information required herein.

1.1.16 Day(s). Unless otherwise designated, day(s) means calendar day(s).

1.1.17 Department of Industrial Relations (or "DIR"). DIR is responsible, among other things, for labor compliance monitoring and enforcement of California prevailing wage laws and regulations for public works contracts.

1.1.18 Design Professional in General Responsible Charge. See definition of Architect above.

1.1.19 Developer. The person or persons identified in the Facilities Lease as contracting to perform the Work to be done under this Contract, or the legal representative of such a person or persons.

1.1.20 Dispute. A separate demand by Developer for a time extension, or payment of money or damages arising from Work done by or on behalf of the Developer pursuant to the Contract and payment of which is not otherwise expressly provided for or Developer is not otherwise entitled to; or an amount of payment disputed by the District.

1.1.21 District. The public agency or the school district for which the Work is performed. The governing board of the District or its designees will act for the District in all matters pertaining to the Contract. The District may, at any time:

1.1.21.1 Direct the Developer to communicate with or provide notice to the Construction Manager or the Architect on matters for which the Contract Documents indicate the Developer will communicate with or provide notice to the District; and/or

1.1.21.2 Direct the Construction Manager or the Architect to communicate with or direct the Developer on matters for which the Contract Documents indicate the District will communicate with or direct the Developer.

1.1.22 Drawings (or "Plans"). The graphic and pictorial portions of the Contract Documents showing the design, location, scope and dimensions of the Work, generally including plans, elevations, sections, details, schedules, sequence of operation, and diagrams.

1.1.23 DSA. Division of the State Architect.

1.1.24 Force Account Directive. A process that may be used when the District and the Developer cannot agree on a price for a specific portion of work or before the Developer prepares a price for a specific portion of work and whereby the Developer performs the work as indicated herein on a time and materials basis.

1.1.25 Guaranteed Maximum Price. The total monies payable to the Developer under the terms and conditions of the Contract Documents.

1.1.26 Job Cost Reports. Any and all reports or records detailing the costs associated with work performed on or related to the Project that Developer shall maintain for the Project. Specifically, Job Cost Reports shall contain, but are not limited by or to, the following information: a description of the work performed or to be performed on the Project; quantity, if applicable, of work performed (hours, square feet, cubic yards, pounds, etc.) for the Project; Project budget; costs for the Project to date; estimated costs to complete the Project; and expected costs at completion. The Job Cost Reports shall also reflect all Contract cost codes, change orders, elements of non-conforming work, back charges, and additional services.

1.1.27 Labor Commissioner's Office (or "Labor Commissioner"). Also known as the Division of Labor Standards Enforcement ("DLSE"): Division of the DIR responsible for adjudicating wage claims, investigating discrimination and public works complaints, and enforcing Labor Code statutes and Industrial Welfare Commission orders.

1.1.28 Material Safety Data Sheets (or "MSDS"). A form with data regarding the properties for potentially harmful substances handled in the workplace.

1.1.29 Municipal Separate Storm Sewer System (or "MS4"). A system of conveyances used to collect and/or convey storm water, including, without limitation, catch basins, curbs, gutters, ditches, man-made channels, and storm drains.

1.1.30 Plans. See "Drawings".

1.1.31 Premises. The real property on which the Site is located.

1.1.32 Product(s). New material, machinery, components, equipment, fixtures and systems forming the Work, including existing materials or components required and approved by the District for reuse.

1.1.33 Product Data. Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Developer to illustrate a material, product, or system for some portion of the Work.

1.1.34 Project. The planned undertaking as provided for in the Contract Documents.

1.1.35 Project Inspector (or "Inspector"). The individual(s) retained by the District in accordance with title 24 of the California Code of Regulations to monitor and inspect the Project.

1.1.36 Project Labor Agreement (or "PLA"). A pre-hire collective bargaining agreement in accordance with Public Contract Code section 2500 *et seq.* that establishes terms and conditions of employment for a specific construction project or projects and/or is an agreement described in Section 158(f) of Title 29 of the United States Code.

1.1.37 Program Manager. The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Program Manager is designated for the Project that is the subject of the Contract Documents, then all references to Program Manager herein shall be read to refer to District.

1.1.38 Proposed Change Order. A Proposed Change Order ("PCO") is a written request prepared by the Developer requesting that the District, the Construction Manager and the Architect issue a Change Order based upon a proposed change to the Work.

1.1.39 Provide. Shall include "provide complete in place," that is, "furnish and install," and "provide complete and functioning as intended in place" unless specifically stated otherwise.

1.1.40 Qualified SWPPP Practitioners ("QSP"). Certified personnel that attended a State Water Resources Control Board sponsored or approved training class and passed the qualifying exam.

1.1.41 Record Drawings. Unless otherwise defined in the Special Conditions, Reproducible drawings (or Plans) prepared pursuant to the requirements of the Contract Documents, that reflect all changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed upon completion of the Project. See also "**As-Built**s."

1.1.42 Request for Information ("RFI" or "RFIs"). A written request prepared by the Developer requesting that the Architect provide additional information necessary to clarify or amplify an item in the Contract Documents that the Developer believes is not clearly shown or called for in the Drawings or Specifications or other portions of the Contract Documents, or to address problems that have arisen under field conditions.

1.1.43 Request for Substitution for Specified Item. A request by Developer to substitute an equal or superior material, product, thing, or service for a specific material, product, thing, or service that has been designated in the Contract Documents by a specific brand or trade name.

1.1.44 Safety Orders. Written and/or verbal orders for construction issued by the California Division of Occupational Safety and Health ("Cal/OSHA") or by the United States Occupational Safety and Health Administration ("OSHA").

1.1.45 Safety Plan. Developer's safety plan specifically adapted for the Project. Developer's Safety Plan shall comply with all provisions regarding

Project safety, including all applicable provisions in these Construction Provisions.

1.1.46 Samples. Physical examples that illustrate materials, products, equipment, finishes, colors, or workmanship and that, when approved in accordance with the Contract Documents, establish standards by which portions of the Work will be judged.

1.1.47 Shop Drawings. All drawings, prints, diagrams, illustrations, brochures, schedules, and other data that are prepared by the Developer, a subcontractor, manufacturer, supplier, or distributor, that illustrate how specific portions of the Work shall be fabricated or installed.

1.1.48 Site. The Project site as shown on the Drawings.

1.1.49 Specifications. That portion of the Contract Documents, Division 1 through Division 49, and all technical sections, and addenda to all of these, if any, consisting of written descriptions and requirements of a technical nature of materials, equipment, construction methods and systems, standards, and workmanship.

1.1.50 State. The State of California.

1.1.51 Storm Water Pollution Prevention Plan (or "SWPPP"). A document which identifies sources and activities at a particular facility that may contribute pollutants to storm water and contains specific control measures and time frames to prevent or treat such pollutants.

1.1.52 Subcontractor. A contractor and/or supplier who is under contract with the Developer or with any other subcontractor, regardless of tier, to perform a portion of the Work of the Project.

1.1.53 Submittal Schedule. The schedule of submittals as provided by Developer and approved by District.

1.1.54 Surety. The person, firm, or corporation that executes as surety the Developer's Performance Bond and Payment Bond, and must be a California admitted surety insurer as defined in the Code of Civil Procedure section 995.120.

1.1.55 Work. All labor, materials, equipment, components, appliances, supervision, coordination, and services required by, or reasonably inferred from, the Contract Documents, that are necessary for the construction and completion of the Project.

1.2 Laws Concerning the Contract Documents

The Contract is subject to all provisions of the Constitution and laws of California and the United States governing, controlling, or affecting District, or the property, funds, operations, or powers of District, and such provisions are by this reference made a part hereof. Any provision required by law to be included in this Contract shall be deemed to be inserted.

1.3 No Oral Agreements

No oral agreement or conversation with any officer, agent, or employee of District, either before or after execution of Contract Documents, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Contract Documents.

1.4 No Assignment

Except as specifically permitted in the Facilities Lease, Developer shall not assign the Contract Documents or any part thereof including, without limitation, any services or money to become due hereunder without the prior written consent of the District. Assignment without District's prior written consent shall be null and void. Any assignment of money due or to become due under the Contract Documents shall be subject to a prior lien for services rendered or material supplied for performance of Work called for under the Contract Documents in favor of all persons, firms, or corporations rendering services or supplying material to the extent that claims are filed pursuant to the Civil Code, Code of Civil Procedure, Government Code, Labor Code, and/or Public Contract Code, and shall also be subject to deductions for liquidated damages or withholding of payments as determined by District in accordance with the Contract Documents. Developer shall not assign or transfer in any manner to a Subcontractor or supplier the right to prosecute or maintain an action against the District.

1.5 Notice and Service Thereof

1.5.1 Any notice from one party to the other or otherwise under the Contract Documents shall be in writing and shall be dated and signed by the party giving notice or by a duly authorized representative of that party. Notice shall not be effective for any purpose whatsoever unless served in one of the following manners:

1.5.1.1 If notice is given by personal delivery thereof, it shall be considered delivered on the day of delivery.

1.5.1.2 If notice is given by overnight delivery service, it shall be considered delivered one (1) day after date deposited, as indicated by the delivery service.

1.5.1.3 If notice is given by depositing same in United States mail, enclosed in a sealed envelope, it shall be considered delivered five (5) days after date deposited, as indicated by the postmarked date.

1.5.1.4 If notice is given by registered or certified mail with postage prepaid, return receipt requested, it shall be considered delivered on the day the notice is signed for.

1.6 No Waiver

The failure of District in any one or more instances to insist upon strict performance of any of the terms of the Contract Documents or to exercise any option herein conferred shall not be construed as a waiver or relinquishment to any extent of the right to assert or rely upon any such terms or option on any future occasion. No action

or failure to act by the District, Architect, or Construction Manager shall constitute a waiver of any right or duty afforded the District under the Contract Documents, nor shall any action or failure to act constitute an approval of or acquiescence on any breach thereunder, except as may be specifically agreed in writing.

1.7 Substitutions For Specified Items

Developer shall not substitute different items for any items identified in the Contract Documents without prior written approval of the District, unless otherwise provided in the Contract Documents.

1.8 Materials and Work

1.8.1 Except as otherwise specifically stated in the Contract Documents, Developer shall provide and pay for all materials, labor, tools, equipment, transportation, supervision, temporary constructions of every nature, and all other services, management, and facilities of every nature whatsoever necessary to execute and complete the Work, in a good and workmanlike manner, within the Contract Time.

1.8.2 Unless otherwise specified, all materials shall be new and of the best quality of their respective kinds and grades as noted or specified, and workmanship shall be of high quality, and Developer shall use all diligence to inform itself fully as to the required manufacturer's instructions and to comply therewith.

1.8.3 Materials shall be furnished in ample quantities and at such times as to insure uninterrupted progress of Work and shall be stored properly and protected from the elements, theft, vandalism, or other loss or damage as required.

1.8.4 For all materials and equipment specified or indicated in the Drawings and Specifications, the Developer shall provide all labor, materials, equipment, and services necessary for complete assemblies and complete working systems, functioning as intended. Incidental items not indicated on Drawings, nor mentioned in the Specifications, that can legitimately and reasonably be inferred to belong to the Work described, or be necessary in good practice to provide a complete assembly or system, shall be furnished as though itemized here in every detail. In all instances, material and equipment shall be installed in strict accordance with each manufacturer's most recent published recommendations and specifications.

1.8.5 Developer shall, after award of the Project by District and after relevant submittals have been approved, place orders for materials and/or equipment as specified so that delivery of same may be made without delays to the Work. Developer shall, upon demand from District, present documentary evidence showing that orders have been placed.

1.8.6 In the event of Developer's neglect in complying or failure to comply with the above instructions, District reserves the right, but has no obligation, to place orders for such materials and/or equipment as the District may deem advisable so that the Work may be completed by the date specified in the Facilities Lease, and all expenses incidental to the procuring of said materials

and/or equipment shall be paid for by Developer or deducted from payment(s) to Developer.

1.8.7 Developer warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver the Site to District, together with all improvements and appurtenances constructed or placed thereon by it, and free from any claims, liens, or charges. Developer further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any work covered by the Contract Documents shall have any right to lien any portion of the Premises or any improvement or appurtenance thereon, except that Developer may install metering devices or other equipment of utility companies or of political subdivision, title to which is commonly retained by utility company or political subdivision. In the event of installation of any such metering device or equipment, Developer shall advise District as to owner thereof.

1.8.8 Nothing contained in this Article, however, shall defeat or impair the rights of persons furnishing materials or labor under any bond given by Developer for their protection or any rights under any law permitting such protection or any rights under any law permitting such persons to look to funds due Developer in hands of District (e.g., Stop Payment Notices), and this provision shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing material for Work when no formal contract is entered into for such material.

1.8.9 Title to new materials and/or equipment for the Work of the Contract Documents and attendant liability for its protection and safety shall remain with Developer until incorporated in the Work of the Contract Documents and accepted by District. No part of any materials and/or equipment shall be removed from its place of storage except for immediate installation in the Work of the Contract Documents. Should the District, in its discretion, allow the Developer to store materials and/or equipment for the Work off-site, Developer will store said materials and/or equipment at a bonded warehouse and with appropriate insurance coverage at no cost to District. Developer shall keep an accurate inventory of all materials and/or equipment in a manner satisfactory to District or its authorized representative and shall, at the District's request, forward it to the District.

2. [Reserved]

3. Architect

3.1 The Architect shall represent the District during the Project and will observe the progress and quality of the Work on behalf of the District. Architect shall have the authority to act on behalf of District to the extent expressly provided in the Contract Documents and to the extent determined by District. Architect shall have authority to reject materials, workmanship, and/or the Work whenever rejection may be necessary, in Architect's reasonable opinion, to insure the proper execution of the Contract Documents.

3.2 Architect shall, with the District and on behalf of the District, determine the amount, quality, acceptability, and fitness of all parts of the Work, and interpret the

Specifications, Drawings, and shall, with the District, interpret all other Contract Documents.

3.3 Architect shall have all authority and responsibility established by law, including title 24 of the California Code of Regulations.

3.4 Developer shall provide District and the Construction Manager with a copy of all written communication between Developer and Architect at the same time as that communication is made to Architect, including, without limitation, all RFIs, correspondence, submittals, claims, and change order requests.

4. Construction Manager

4.1 If a Construction Manager is used on this Project ("Construction Manager" or "CM"), the Construction Manager will provide administration of the Contract Documents on the District's behalf. After execution of the Contract Documents, all correspondence and/or instructions from Developer and/or District shall be forwarded through the Construction Manager. The Construction Manager will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences, or procedures or for safety precautions in connection with the Work, which shall all remain the Developer's responsibility.

4.2 The Construction Manager, however, will have authority to reject materials and/or workmanship not conforming to the Contract Documents, as determined by the District, the Architect, and/or the Project Inspector. The Construction Manager shall also have the authority to require special inspection or testing of any portion of the Work, whether it has been fabricated, installed, or fully completed. Any decision made by the Construction Manager in good faith, shall not give rise to any duty or responsibility of the Construction Manager to: the Developer, any Subcontractor, or their agents, employees, or other persons performing any of the Work. The Construction Manager shall have free access to any or all parts of Work at any time.

4.3 If the District does not use a Construction Manager on this Project, all references to Construction Manager or CM shall be read as District.

5. Inspector, Inspections, and Tests

5.1 Project Inspector

5.1.1 One or more Project Inspector(s), including special Project Inspector(s), as required, will be assigned to the Work by District, in accordance with requirements of title 24, part 1, of the California Code of Regulations, to enforce the building code and monitor compliance with Plans and Specifications for the Project previously approved by the DSA. Duties of Project Inspector(s) are specifically defined in section 4-342 of said part 1 of title 24.

5.1.2 No Work shall be carried on except with the knowledge and under the inspection of the Project Inspector(s). The Project Inspector(s) shall have free access to any or all parts of Work at any time. Developer shall furnish Project Inspector(s) reasonable opportunities for obtaining such information as may be necessary to keep Project Inspector(s) fully informed respecting progress and manner of work and character of materials, including, but not limited to, submission of form DSA 156 (or the most current version applicable at the time

the Work is performed) to the Project Inspector at least 48 hours in advance of the commencement and completion of construction of each and every aspect of the Work. Forms are available on the DSA's website at: <http://www.dgs.ca.gov/dsa/Forms.aspx>. Inspection of Work shall not relieve Developer from an obligation to fulfill the Contract Documents. Project Inspector(s) and the DSA are authorized to suspend work whenever the Developer and/or its Subcontractor(s) are not complying with the Contract Documents. Any work stoppage by the Project Inspector(s) and/or DSA shall be without liability to the District. Developer shall instruct its Subcontractors and employees accordingly.

5.1.3 If Developer and/or any Subcontractor requests that the Project Inspector(s) perform any inspection off-Site, this shall only be done if it is allowable pursuant to applicable regulations and DSA approval, if the Project Inspector(s) agree to do so, and at the expense of the Developer.

5.2 Tests and Inspections

5.2.1 Tests and Inspections shall comply with title 24, part 1, California Code of Regulations, group 1, article 5, section 4-335, and with the provisions of the Specifications.

5.2.2 The District will select an independent testing laboratory to conduct the tests. Selection of the materials required to be tested shall be by the laboratory or the District's representative and not by the Developer. The Developer shall notify the District's representative a sufficient time in advance of its readiness for required observation or inspection. This notice shall be provided, at a minimum, forty-eight (48) hours prior to the inspection of the material that needs to be tested and, at a minimum, seventy-two (72) hours prior to any special or off-site inspection.

5.2.3 The Developer shall notify the District's representative a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents that must by terms of the Contract Documents be tested so that the District may arrange for the testing of same at the source of supply. This notice shall be provided, at a minimum, seventy-two (72) hours prior to the manufacture of the material that needs to be tested.

5.2.4 Any material shipped by the Developer from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated into and/or onto the Project.

5.2.5 The District will select the testing laboratory and pay for the costs for all tests and inspections. Developer shall reimburse the District for any and all laboratory costs or other testing costs for any materials found to be not in compliance with the Contract Documents. At the District's discretion, District may elect to deduct laboratory or other testing costs for noncompliant materials from the Guaranteed Maximum Price, and such deduction shall not constitute a withholding.

5.3 Costs for After Hours and/or Off Site Inspections

If the Developer performs Work outside the Inspector's regular working hours, costs of any inspections required outside regular working hours shall be borne by the Developer and may be invoiced to the Developer by the District or the District may deduct those expenses from the next Tenant Improvement Payment.

6. Developer

Developer shall construct and complete, in a good and workmanlike manner, the Work for the Guaranteed Maximum Price including any adjustment(s) to the Guaranteed Maximum Price pursuant to provisions herein regarding changes to the Guaranteed Maximum Price. Except as otherwise noted, Developer shall provide and pay for all labor, materials, equipment, permits (excluding DSA), fees, licenses, facilities, transportation, taxes, bonds and insurance, and services necessary for the proper execution and completion of the Work, except as indicated herein.

6.1 Status of Developer

6.1.1 Developer is and shall at all times be deemed to be an independent contractor and shall be wholly responsible for the manner in which it and its Subcontractors perform the services required of it by the Contract Documents. Nothing herein contained shall be construed as creating the relationship of employer and employee, or principal and agent, between the District, or any of the District's employees or agents, and Developer or any of Developer's Subcontractors, agents or employees. Developer assumes exclusively the responsibility for the acts of its agents and employees as they relate to the services to be provided during the course and scope of their employment. Developer, its Subcontractors, and its agents and employees shall not be entitled to any rights or privileges of District employees. District shall be permitted to monitor the Developer's activities to determine compliance with the terms of the Contract Documents.

6.1.2 As required by law, Developer and all Subcontractors shall be properly licensed and regulated by the Contractors State License Board, 9821 Business Park Drive, Sacramento, California 95827 (Post Office Box 26000, Sacramento, California 95826), <http://www.cslb.ca.gov>.

6.1.3 As required by law, Developer and all Subcontractors shall be properly registered as public works contractors by the Department of Industrial Relations at <https://efiling.dir.ca.gov/PWCR/ActionServlet?action=displayPWCRRegistration> Form or current URL.

6.1.4 Developer represents that it has no existing interest and will not acquire any interest, direct or indirect, which could conflict in any manner or degree with the performance of Work required under this Contract and that no person having any such interest shall be employed by Developer.

6.2 Project Inspection Card(s)

Developer shall verify that forms DSA 152 (or most current version applicable at the time the Work is performed) are issued for the Project prior to the commencement of construction.

6.3 Developer's Supervision

6.3.1 During progress of the Work, Developer shall keep on the Premises, and at all other locations where any Work related to the Contract is being performed, an experienced and competent project manager and construction superintendent who are employees of the Developer, to whom the District does not object and at least one of whom shall be fluent in English, written and verbal.

6.3.2 The project manager and construction superintendent shall both speak fluently the predominant language of the Developer's employees.

6.3.3 Before commencing the Work herein, Developer shall give written notice to District of the name of its project manager and construction superintendent. Neither the Developer's project manager nor construction superintendent shall be changed except with prior written notice to District. If the Developer's project manager and/or construction superintendent proves to be unsatisfactory to Developer, or to District, any of the District's employees, agents, the Construction Manager, or the Architect, Developer shall immediately notify District in writing before any change occurs, but no less than two (2) business days prior. Any replacement of the project manager and/or construction superintendent shall be made promptly and must be satisfactory to the District. The Developer's project manager and construction superintendent shall each represent Developer, and all directions given to Developer's project manager and/or construction superintendent shall be as binding as if given to Developer.

6.3.4 Developer shall give efficient supervision to Work, using its best skill and attention. Developer shall carefully study and compare all Contract Documents, Drawings, Specifications, and other instructions and shall at once report to District, Construction Manager, and Architect any error, inconsistency, or omission that Developer or its employees and Subcontractors may discover, in writing, with a copy to District's Project Inspector(s). Developer shall have responsibility for discovery of errors, inconsistencies, or omissions.

6.3.5 All contractors doing work on the Project will provide their workers with identification badges. These badges will be worn by all members of the contractor's staff who are working in a District facility.

6.3.5.1 Badges must be filled out in full and contain the following information:

6.3.5.1.1 Name of contractor

6.3.5.1.2 Name of employee

6.3.5.1.3 Contractor's address and phone number

6.3.5.2 Badges are to be worn when the Developer or his/her employees are on site and must be visible at all times. Contractors must inform their employees that they are required to allow District employees, the Architect, the Construction Manager, the Program Manager, or the Project Inspector to review the information on the badges upon request.

6.3.5.3 Continued failure to display identification badges as required by this policy may result in the individual being removed from the Project or assessment of fines against the contractor.

6.4 Duty to Provide Fit Workers

6.4.1 Developer and Subcontractor(s) shall at all times enforce strict discipline and good order among their employees and shall not employ any unfit person or anyone not skilled in work assigned to that person. It shall be the responsibility of Developer to ensure compliance with this requirement. District may require Developer to permanently remove unfit persons from Project Site.

6.4.2 Any person in the employ of Developer or Subcontractor(s) whom District may deem incompetent or unfit shall be excluded from working on the Project and shall not again be employed on the Project except with the prior written consent of District.

6.4.3 The Developer shall furnish labor that can work in harmony with all other elements of labor employed or to be employed in the Work.

6.4.4 If Developer intends to make any change in the name or legal nature of the Developer's entity, Developer shall first notify the District in writing prior to making any contemplated change. The District shall determine in writing if Developer's intended change is permissible while performing the Work.

6.5 Field Office

6.5.1 Developer shall provide on the Work Site a temporary office.

6.6 Purchase of Materials and Equipment

The Developer is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from District to assure that there will be no delays.

6.7 Documents on Work

6.7.1 Developer shall at all times keep on the Work Site, or at another location as the District may authorize in writing, one legible copy of all Contract Documents, including Addenda and Change Orders, and Titles 19 and 24 of the California Code of Regulations, the specified edition(s) of the Uniform Building Code, all approved Drawings, Plans, Schedules, and Specifications, and all codes and documents referred to in the Specifications, and made part thereof. These documents shall be kept in good order and available to District, Construction Manager, Architect, Architect's representatives, the Project Inspector(s), and all authorities having jurisdiction. Developer shall be

acquainted with and comply with the provisions of these titles as they relate to this Project. (See particularly the duties of Contractor, Title 24, Part 1, California Code of Regulations, Section 4-343.) Developer shall also be acquainted with and comply with all California Code of Regulations provisions relating to conditions on this Project, particularly Titles 8 and 17. Developer shall coordinate with Architect and Construction Manager and shall submit its verified report(s) according to the requirements of Title 24.

6.7.2 Daily Job Reports

6.7.2.1 Developer shall maintain, at a minimum, at least one (1) set of Daily Job Reports on the Project. These must be prepared by the Developer's employee(s) who are present on Site, and must include, at a minimum, the following information:

6.7.2.1.1 A brief description of all Work performed on that day.

6.7.2.1.2 A summary of all other pertinent events and/or occurrences on that day.

6.7.2.1.3 The weather conditions on that day.

6.7.2.1.4 A list of all Subcontractor(s) working on that day, including DIR registration numbers.

6.7.2.1.5 A list of each Developer employee working on that day and the total hours worked for each employee.

6.7.2.1.6 A complete list of all equipment on Site that day, whether in use or not.

6.7.2.1.7 A complete list of all materials, supplies, and equipment delivered on that day.

6.7.2.1.8 A complete list of all inspections and tests performed on that day.

6.7.2.2 Each day Developer shall provide a copy of the previous day's Daily Job Report to the District or the District's Construction Manager.

6.8 Preservation of Records

Developer shall maintain, and District shall have the right to inspect, Developer's financial records for the Project, including, without limitation, Job Cost Reports for the Project in compliance with the criteria set forth herein. The District shall have the right to examine and audit all Daily Job Reports or other Project records of Developer's project manager(s), project superintendent(s), and/or project foreperson(s), all certified payroll records and/or related documents including, without limitation, Job Cost Reports, payroll, payment, timekeeping and tracking documents; and as it pertains to change orders, all books, estimates, records, contracts, documents, cost data, subcontract job cost reports, and other data of the Developer, any Subcontractor, and/or supplier, including computations and projections related to estimating, negotiating, pricing, or performing the Work or modification, in order to

evaluate the accuracy, completeness, and currency of the cost, manpower, coordination, supervision, or pricing data at no additional cost to the District. These documents may be duplicative and/or be in addition to any documents held in escrow by the District. The Developer shall make available at its office at all reasonable times the materials described in this paragraph for the examination, audit, or reproduction until three (3) years after final payment under this Facilities Lease. Notwithstanding the provisions above, Developer shall provide any records requested by any governmental agency, if available, after the time set forth above.

6.9 Integration of Work

6.9.1 Developer shall do all cutting, fitting, patching, and preparation of Work as required to make its several parts come together properly, to fit it to receive or be received by work of other contractors, and to coordinate tolerances to various pieces of work, showing upon, or reasonably implied by, the Drawings and Specifications for the completed structure, and shall conform them as District and/or Architect may direct.

6.9.2 Developer shall make its own layout of lines and elevations and shall be responsible for the accuracy of both Developer's and Subcontractors' work resulting therefrom.

6.9.3 Developer and all Subcontractors shall take all field dimensions required in performance of the Work, and shall verify all dimensions and conditions on the Site. All dimensions affecting proper fabrication and installation of all Work must be verified prior to fabrication by taking field measurements of the true conditions. If there are any discrepancies between dimensions in drawings and existing conditions which will affect the Work, Developer shall bring such discrepancies to the attention of the District and Architect for adjustment before proceeding with the Work.

6.9.4 All costs caused by noncompliant, defective, or delayed Work shall be borne by Developer, inclusive of repair work.

6.9.5 Developer shall not endanger any work performed by it or anyone else by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor except with consent of District.

6.10 Notifications

6.10.1 Developer shall notify the Architect and Project Inspector, in writing, of the commencement of construction of each and every aspect of the Work at least 48 hours in advance by submitting form DSA 156 (or the most current version applicable at the time the Work is performed) to the Project Inspector. Forms are available on the DSA's website at:
<http://www.dgs.ca.gov/dsa/Forms.aspx>.

6.10.2 Developer shall notify the Architect and Project Inspector, in writing, of the completion of construction of each and every aspect of the Work at least 48 hours in advance by submitting form DSA 156 (or the most current version applicable at the time the Work is performed) to the Project Inspector.

6.11 Obtaining of Permits, Licenses and Registrations

Developer shall secure and pay for any permits (except DSA), licenses, registrations, approvals, and certificates necessary for prosecution of Work, including but not limited to those listed in the Special Conditions, Exhibit D-1, if any, before the date of the commencement of the Work or before the permits, licenses, registrations, approvals and certificates are legally required to continue the Work without interruption. The Developer shall obtain and pay, only when legally required, for all licenses, approvals, registrations, permits, inspections, and inspection certificates required to be obtained from or issued by any authority having jurisdiction over any part of the Work included in the Contract Documents. All final permits, licenses, registrations, approvals and certificates shall be delivered to District before demand is made for final payment. The costs associated with said permits, licenses, registrations, approvals and certificates shall be direct reimbursement items and are not subject to any markup.

6.12 Royalties and Patents

6.12.1 Developer shall obtain and pay, when legally required, all royalties and license fees necessary for prosecution of Work before the earlier of the date of the commencement of the Work or the date the license is legally required to continue the Work without interruption. Developer shall defend suits or claims of infringement of patent, copyright, or other rights and shall hold the District, Construction Manager and the Architect harmless and indemnify them from loss on account thereof except when a particular design, process, or make or model of product is required by the Contract Documents. However, if the Developer has reason to believe that the required design, process, or product is an infringement of a patent or copyright, the Developer shall indemnify and defend the District, Construction Manager and Architect against any loss or damage.

6.12.2 The review by the District, Construction Manager or Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be only as to its adequacy for the Work and shall not constitute approve use by the Developer in violation of any patent or other rights of any person or entity.

6.13 Work to Comply With Applicable Laws and Regulations

6.13.1 Developer shall give all notices and comply with the following specific laws, ordinances, rules, and regulations and all other applicable laws, ordinances, rules, and regulations bearing on conduct of Work as indicated and specified, including but not limited to the appropriate statutes and administrative code sections. If Developer observes that Drawings and Specifications are at variance with any applicable laws, ordinances, rules and regulations, or should Developer become aware of the development of conditions not covered by Contract Documents that may result in finished Work being at variance therewith, Developer shall promptly notify District in writing and any changes deemed necessary by District shall be made as provided in this Exhibit D for changes in Work.

6.13.1.1 National Electrical Safety Code, U. S. Department of Commerce

6.13.1.2 National Board of Fire Underwriters' Regulations

6.13.1.3 International Building Code, latest addition, and the California Code of Regulations, title 24, and other amendments

6.13.1.4 Manual of Accident Prevention in Construction, latest edition, published by A.G.C. of America

6.13.1.5 Industrial Accident Commission's Safety Orders, State of California

6.13.1.6 Regulations of the State Fire Marshall (title 19, California Code of Regulations) and Pertinent Local Fire Safety Codes

6.13.1.7 Americans with Disabilities Act

6.13.1.8 Education Code of the State of California

6.13.1.9 Government Code of the State of California

6.13.1.10 Labor Code of the State of California, division 2, part 7, Public Works and Public Agencies

6.13.1.11 Public Contract Code of the State of California

6.13.1.12 California Art Preservation Act

6.13.1.13 U. S. Copyright Act

6.13.1.14 U. S. Visual Artists Rights Act

6.13.2 Developer shall comply with all applicable mitigation measures, if any, adopted by any public agency with respect to this Project pursuant to the California Environmental Quality Act (Public Resources Code section 21000 et seq.).

6.13.3 If Developer performs any Work that it knew, or through exercise of reasonable care should have known, to be contrary to any applicable laws, ordinance, rules, or regulations, Developer shall bear all costs arising therefrom and arising from the correction of said Work.

6.13.4 Where Specifications or Drawings state that materials, processes, or procedures must be approved by the DSA, State Fire Marshall, or other body or agency, Developer shall use its best efforts to satisfy the requirements of such bodies or agencies applicable at the time the Work is performed, and as determined by those bodies or agencies.

6.14 Safety/Protection of Persons and Property

6.14.1 The Developer will be solely and completely responsible for conditions of the Work Site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and not be limited to normal working hours.

6.14.2 The wearing of hard hats will be mandatory at all times for all personnel on Site. Developer shall supply sufficient hard hats to properly equip all employees and visitors.

6.14.3 Any construction review of the Developer's performance is not intended to include review of the adequacy of the Developer's safety measures in, on, or near the Work Site.

6.14.4 Implementation and maintenance of safety programs shall be the sole responsibility of the Developer.

6.14.5 The Developer shall furnish to the District a copy of the Developer's safety plan within the time frame indicated in the Contract Documents and specifically adapted for the Project.

6.14.6 Developer shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of the Contract Documents and shall take all necessary measures and be responsible for the proper care and completion and final acceptance by District. All Work shall be solely at Developer's risk.

6.14.7 Developer shall take, and require Subcontractors to take, all necessary precautions for safety of workers on the Project and shall comply with all applicable federal, state, local, and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where Work is being performed and to provide a safe and healthful place of employment. Developer shall furnish, erect, and properly maintain at all times, all necessary safety devices, safeguards, construction canopies, signs, nets, barriers, lights, and watchmen for protection of workers and the public and shall post danger signs warning against hazards created by such features in the course of construction.

6.14.8 Hazards Control –Developer shall store volatile wastes in approved covered metal containers and remove them from the Site daily. Developer shall prevent accumulation of wastes that create hazardous conditions. Developer shall provide adequate ventilation during use of volatile or noxious substances.

6.14.9 Developer shall designate a responsible member of its organization on the Project, whose duty shall be to post information regarding protection and obligations of workers and other notices required under occupational safety and health laws, to comply with reporting and other occupational safety requirements, and to protect the life, safety, and health of workers. Name and position of person so designated shall be reported to District by Developer.

6.14.10 Developer shall correct any violations of safety laws, rules, orders, standards, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health, Developer shall correct such violation promptly.

6.14.11 Developer shall comply with any District storm water requirements that are approved by the District and applicable to the Project, at no additional cost to the District.

6.14.12 In an emergency affecting safety of life or of work or of adjoining property, Developer, without special instruction or authorization, shall act, at its discretion, to prevent such threatened loss or injury. Any compensation claimed by Developer on account of emergency work shall be determined by agreement.

6.14.13 All salvage materials will become the property of the Developer and shall be removed from the Site unless otherwise called for in the Contract Documents. However, the District reserves the right to designate certain items of value that shall be turned over to the District unless otherwise directed by District.

6.14.14 All connections to public utilities and/or existing on-site services shall be made and maintained in such a manner as to not interfere with the continuing use of same by the District during the entire progress of the Work.

6.14.15 Developer shall provide such heat, covering, and enclosures as are necessary to protect all Work, materials, equipment, appliances, and tools against damage by weather conditions, such as extreme heat, cold, rain, snow, dry winds, flooding, or dampness.

6.14.16 The Developer shall protect and preserve the Work from all damage or accident, providing any temporary roofs, window and door coverings, boxings, or other construction as required by the Architect. The Developer shall be responsible for existing structures, walks, roads, trees, landscaping, and/or improvements in working areas; and shall provide adequate protection therefor. If temporary removal is necessary of any of the above items, or damage occurs due to the Work, the Developer shall replace same at his expense with same kind, quality, and size of Work or item damaged. This shall include any adjoining property of the District and others.

6.14.17 Developer shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property, and structures (including, without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations.

6.14.18 Developer shall confine apparatus, the storage of materials, and the operations of workers to limits indicated by law, ordinances, permits, or directions of Architect, and shall not interfere with the Work or unreasonably encumber Premises or overload any structure with materials. Developer shall enforce all instructions of District and Architect regarding signs, advertising, fires, and smoking, and require that all workers comply with all regulations while on Project Site.

6.14.19 Developer, Developer's employees, Subcontractors, Subcontractors' employees, or any person associated with the Work shall conduct themselves in a manner appropriate for a school site. No verbal or physical contact with neighbors, students, and faculty, profanity, or inappropriate attire or behavior will be permitted. District may require Developer to permanently remove non-complying persons from Project Site.

6.14.20 Developer shall take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed, Developer shall have a civil engineer, registered as a professional engineer in California, replace them at no cost to District.

6.14.21 In the event that the Developer enters into any agreement with owners of any adjacent property to enter upon the adjacent property for the purpose of performing the Work, Developer shall fully indemnify, defend, and hold harmless each person, entity, firm, or agency that owns or has any interest in adjacent property. The form and content of the agreement of indemnification shall be approved by the District prior to the commencement of any Work on or about the adjacent property. The Developer shall also indemnify the District as provided in the indemnification provision herein. These provisions shall be in addition to any other requirements of the owners of the adjacent property.

6.15 General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities ("General Permit")

6.15.1 Developer acknowledges that all California school districts are obligated to develop and implement the following requirements for the discharge of storm water to surface waters from its construction and land disturbance activities (storm water requirements), without limitation:

6.15.1.1 A Municipal Separate Storm Sewer System (MS4). An MS4 is a system of conveyances used to collect and/or convey storm water, including, without limitation, catch basins, curbs, gutters, ditches, man-made channels, and storm drains.

6.15.1.2 A Storm Water Pollution Prevention Plan ("SWPPP") that contains specific best management practices ("BMPs") and establishes numeric effluent limitations at:

6.15.1.2.1 Sites where the District engages in maintenance (e.g., fueling, cleaning, repairing) or transportation activities.

6.15.1.2.2 Construction sites where:

6.15.1.2.2.1 One (1) or more acres of soil will be disturbed, or

6.15.1.2.2.1.1 The Project is part of a larger common plan of development that disturbs more than one (1) acre of soil.

6.15.2 District shall develop and pay for a SWPPP and Developer shall comply with any District storm water requirements that are approved by the District and applicable to the Project, at no additional cost to the District.

6.15.3 At no additional cost to the District, Developer shall provide a Qualified Storm Water Practitioner who shall be onsite and implement and monitor any and all SWPPP requirements applicable to the Project, including but not limited to:

6.15.3.1 At least forty eight (48) hours prior to a forecasted rain event, implementing the Rain Event Action Plan (REAP) for any rain event requiring implementation of the REAP, including any erosion and sediment control measures needed to protect all exposed portions of the site; and

6.15.3.2 Monitoring any Numeric Action Levels (NALs), if applicable.

6.17 Working Evenings and Weekends

Developer may be required to work increased hours, evenings, and/or weekends at no additional cost to the District. Developer shall give the District forty-eight (48) hours' notice prior to performing any evening and/or weekend work. Developer shall perform all evening and/or weekend work in compliance with all applicable rules, regulations, laws, and local ordinances including, without limitation, all noise and light limitations. Developer shall reimburse the District for any increased or additional Inspector charges as a result of the Developer's increased hours, or evening and/or weekend work.

6.18 Cleaning Up

6.18.1 The Developer shall provide all services, labor, materials, and equipment necessary for protecting and securing the Work, all school occupants, furnishings, equipment, and building structure from damage until its completion and final acceptance by District. Dust barriers shall be provided to isolate dust and dirt from construction operations. At completion of the Work and portions thereof, Developer shall clean to the original state any areas beyond the Work area that become dust laden as a result of the Work. The Developer must erect the necessary warning signs and barricades to ensure the safety of all school occupants. The Developer at all times must maintain good housekeeping practices to reduce the risk of fire damage and must make a fire extinguisher, fire blanket, and/or fire watch, as applicable, available at each location where cutting, braising, soldering, and/or welding is being performed or where there is an increased risk of fire.

6.18.2 Developer at all times shall keep Premises, including property immediately adjacent thereto, free from debris such as waste, rubbish (including personal rubbish of workers, e.g., food wrappers, etc.), and excess materials and equipment caused by the Work. Developer shall not leave debris under, in, or about the Premises (or surrounding property or neighborhood), but shall promptly remove same from the Premises on a daily basis. If Developer fails to clean up, District may do so and the cost thereof shall be charged to Developer. If the Contract calls for Work on an existing facility, Developer shall also perform specific clean-up on or about the Premises upon request by the District as it deems necessary for the continuing education process. Developer shall comply with all related provisions of the Specifications.

6.18.3 If the Construction Manager, Architect, or District observes the accumulation of trash and debris, the District will give the Developer a 24-hour written notice to mitigate the condition.

6.18.4 Should the Developer fail to perform the required clean-up, or should the clean-up be deemed unsatisfactory by the District, the District will then

perform the clean-up. All cost associated with the clean-up work (including all travel, payroll burden, and costs for supervision) will be deducted from the Guaranteed Maximum Price, or District may withhold those amounts from payment(s) to Developer.

7. Subcontractors

7.1 Developer shall provide the District with information for all of Developer's Subcontracts and Subcontractors as indicated in the Developer's Submittals and Schedules Section herein.

7.2 No contractual relationship exists between the District and any Subcontractor, supplier, or sub-subcontractor by reason of the Contract Documents.

7.3 Developer agrees to bind every Subcontractor by terms of the Contract Documents as far as those terms that are applicable to Subcontractor's work including, without limitation, all labor, wage & hour, apprentice and related provisions and requirements. If Developer subcontracts any part of the Work called for by the Contract Documents, Developer shall be as fully responsible to District for acts and omissions of any Subcontractor and of persons either directly or indirectly employed by any Subcontractor, including Subcontractor caused Project delays, as it is for acts and omissions of persons directly employed by Developer. The divisions or sections of the Specifications and/or the arrangements of the drawings are not intended to control the Developer in dividing the Work among Subcontractors or limit the work performed by any trade.

7.4 District's consent to, or approval of, or failure to object to, any Subcontractor under the Contract Documents shall not in any way relieve Developer of any obligations under the Contract Documents and no such consent shall be deemed to waive any provisions of the Contract Documents.

7.5 Developer is directed to familiarize itself with sections 1720 through 1861 of the Labor Code of the State of California, as regards the payment of prevailing wages and related issues, and to comply with all applicable requirements therein including, without limitation, section 1775 and the Developer's and Subcontractors' obligations and liability for violations of prevailing wage law and other applicable laws.

7.6 Developer shall be responsible for the coordination of the trades, Subcontractors, sub-subcontractors, and material or equipment suppliers working on the Project.

7.6.1 Developer is responsible for ensuring that first-tier Subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, and/or C-46 licenses, are prequalified by the District to work on the Project pursuant to Public Contract Code section 20111.6.

7.6.2 Developer is responsible for ensuring that all Subcontractors are properly registered as public works contractors by the Department of Industrial Relations.

7.7 Developer is solely responsible for settling any differences between the Developer and its Subcontractor(s) or between Subcontractors.

7.8 Developer must include in all of its subcontracts the assignment provisions indicated in the Termination section of these Construction Provisions.

8. Other Contracts/Contractors

8.1 District reserves the right to let other contracts, and/or to perform work with its own forces, in connection with the Project. Developer shall afford other contractors reasonable opportunity for introduction and storage of their materials and execution of their work and shall properly coordinate and connect Developer's Work with the work of other contractors.

8.2 Developer shall protect the work of any other contractor that Developer encounters while working on the Project.

8.3 If any part of Developer's Work depends for proper execution or results upon work of District or any other contractor, the Developer shall visually inspect, and with reasonable effort, physically inspect all accessible portions of District's or any other contractor's work and, before proceeding with its Work, promptly report to the District in writing any defects in District's or any other contractor's work that render Developer's Work unsuitable for proper execution and results. Developer shall be held accountable for damages to District for District's or any other contractor's work that Developer failed to inspect or should have inspected. Developer's failure to inspect and report shall constitute Developer's acceptance of all District's or any other contractor's work as fit and proper for reception of Developer's Work, except as to defects that may develop in District's or any other contractor's work after execution of Developer's Work and not caused by execution of Developer's Work.

8.4 To ensure proper execution of its subsequent Work, Developer shall measure and inspect Work already in place and shall at once report to the District in writing any discrepancy between that executed Work and the Contract Documents.

8.5 Developer shall ascertain to its own satisfaction the scope of the Project and nature of District's or any other contracts that have been or may be awarded by District in prosecution of the Project to the end that Developer may perform under the Contract in light of the other contracts, if any.

8.6 Nothing herein contained shall be interpreted as granting to Developer exclusive occupancy of the Site, the Premises, or of the Project. Developer shall not cause any unnecessary hindrance or delay to the use and/or school operation(s) of the Premises and/or to District or any other contractor working on the Project. If simultaneous execution of any contract or school operation is likely to cause interference with performance of Developer's obligations under the Contract Documents, Developer shall coordinate with those contractor(s), person(s), and/or entity(s) and shall notify the District of the resolution.

9. Drawings and Specifications

9.1 A complete list of all Drawings that form a part of the Contract Documents are to be found as an index on the Drawings themselves, and/or may be provided to the Developer and/or in the Table of Contents.

9.2 Materials or Work described in words that so applied have a well-known technical or trade meaning shall be deemed to refer to recognized standards, unless noted otherwise.

9.3 Trade Name or Trade Term

It is not the intention of the Contract Documents to go into detailed descriptions of any materials and/or methods commonly known to the trade under "trade name" or "trade term." The mere mention or notation of "trade name" or "trade term" shall be considered a sufficient notice to Developer that it will be required to complete the work so named, complete, finished, and operable, with all its appurtenances, according to the best practices of the trade.

9.4 The naming of any material and/or equipment shall mean furnishing and installing of same, including all incidental and accessory items thereto and/or labor therefor, as per best practices of the trade(s) involved, unless specifically noted otherwise.

9.5 Contract Documents are complementary, and what is called for by one shall be binding as if called for by all. As such, Drawings and Specifications are intended to be fully cooperative and to agree. However, if Developer observes that Drawings and Specifications are in conflict with the Contract Documents, Developer shall promptly notify District and Architect in writing, and any necessary changes shall be made as provided in the Contract Documents.

9.6 Figured dimensions shall be followed in preference to scaled dimensions, and the Developer shall make all additional measurements necessary for the work and shall be responsible for their accuracy. Before ordering any material or doing any work, each Developer shall verify all measurements at the building and shall be responsible for the correctness of same.

9.7 Should any question arise concerning the intent or meaning of the Contract Documents, including the Plans and Specifications, the question shall be submitted to the District for interpretation. If a conflict exists in the Contract Documents, these Construction Provisions shall control over the Facilities Lease, which shall control over the Site Lease, which shall control over Division 1 Documents, which shall control over Division 2 through Division 49 documents, which shall control over figured dimensions, which shall control over large-scale drawings, which shall control over small-scale drawings. In no case shall a document calling for lower quality and/or quantity of material or workmanship control. However, in the case of discrepancy or ambiguity solely between and among the Drawings and Specifications, the discrepancy or ambiguity shall be resolved in favor of the interpretation that will provide District with the functionally complete and operable Project described in the Drawings and Specifications.

9.8 Drawings and Specifications are intended to comply with all laws, ordinances, rules, and regulations of constituted authorities having jurisdiction, and where referred to in the Contract Documents, the laws, ordinances, rules, and regulations shall be considered as a part of the Contract Documents within the limits specified.

9.9 As required by Section 4-317(c), Part 1, Title 24, CCR: "Should any existing conditions such as deterioration or non-complying construction be discovered which is not covered by the DSA-approved documents wherein the finished work will not comply

with Title 24, California Code of Regulations, a construction change document, or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work."

9.10 Ownership of Drawings

All copies of Plans, Drawings, Designs, Specifications, and copies of other incidental architectural and engineering work, or copies of other Contract Documents furnished by District, are the property of District. They are not to be used by Developer in other work and, with the exception of signed sets of Contract Documents, are to be returned to District on request at completion of Work, or may be used by District as it may require without any additional costs to District. Neither the Developer nor any Subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect. District hereby grants the Developer, Subcontractors, sub-subcontractors, and material or equipment suppliers a limited license to use applicable portions of the Drawings prepared for the Project in the execution of their Work under the Contract Documents.

10. Developer's Submittals and Schedules

Developer's submittals shall comply with the provisions and requirements of the Specifications including, without limitation Submittals.

10.1 Schedule of Work, Schedule of Submittals, and Schedule of Values.

10.1.1 The Developer shall comply with the construction schedule attached to the Facilities Lease as Exhibit F ("Construction Schedule"). [To be attached when available.]

10.1.2 Developer must provide all schedules both in hard copy and electronically, in a format (e.g. Microsoft Project or Primavera) approved in advance by the District.

10.1.3 The District will review the schedules submitted and the Developer shall make changes and corrections in the schedules as requested by the District and resubmit the schedules until approved by the District.

10.1.4 The District shall have the right at any time to discuss with the Developer revisions to the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.1.5 All submittals and schedules must be approved by the District before Developer can rely on them as a basis for payment.

10.1.6 Within TEN (10) calendar days after the date of the Notice to Proceed with Construction (unless otherwise specified in the Specifications), the Developer shall prepare and submit to the District for review, in a form supported by sufficient data to substantiate its accuracy as the District may require:

10.1.6.1 Preliminary Schedule

A preliminary schedule of construction indicating the starting and completion dates of the various stages of the Work, including any information and following any form as may be specified in the Specifications. Once approved by District, this shall become the Construction Schedule. This schedule shall include and identify all tasks that are on the Project's critical path with a specific determination of the start and completion of each critical path task as well as all Contract milestones and each milestone's completion date(s) as may be required by the District.

10.1.6.1.1 The District is not required to approve a preliminary schedule of construction with early completion, i.e., one that shows early completion dates for the Work and/or milestones. Developer shall not be entitled to extra compensation if the District approves a Construction Schedule with an early completion date and Developer completes the Project beyond the date shown in the schedule but within the Contract Time. A Construction Schedule showing the Work completed in less than the Contract Time, the time between the early completion date and the end of the Contract Time shall be Float.

10.1.6.2 Preliminary Schedule of Values

A preliminary schedule of values for all of the Work, which must include quantities and prices of items aggregating the Contract Price and must subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Unless the Special Conditions contain different limits, this preliminary schedule of values shall include, at a minimum, the following information and the following structure:

10.1.6.2.1 Divided into at least the following categories:

10.1.6.2.1.1 Overhead and profit

10.1.6.2.1.2 Supervision

10.1.6.2.1.3 General conditions

10.1.6.2.1.4 Layout

10.1.6.2.1.5 Mobilization

10.1.6.2.1.6 Submittals

10.1.6.2.1.7 Bonds and insurance

10.1.6.2.1.8 Close-out/Certification documentation

10.1.6.2.1.9 Demolition

10.1.6.2.1.10 Installation

10.1.6.2.1.11 Rough-in

10.1.6.2.1.12 Finishes

10.1.6.2.1.13 Testing

10.1.6.2.1.14 Punch list and District acceptance

10.1.6.2.2 And also divided by each of the following areas:

10.1.6.2.2.1 Site work

10.1.6.2.2.2 By each building

10.1.6.2.2.3 By each floor

10.1.6.2.3 The preliminary schedule of values shall not provide for values any greater than the following percentages of the Contract value:

10.1.6.2.3.1 Mobilization and layout combined to equal not more than 1%.

10.1.6.2.3.2 Submittals, samples and shop drawings combined to equal not more than 3%.

10.1.6.2.3.3 Bonds and insurance combined to equal not more than 2%.

10.1.6.2.3.4 Closeout documentation shall have a value in the preliminary schedule of not less than 3%.

10.1.6.2.4 Notwithstanding any provision of the Contract Documents to the contrary, payment of the Developer's overhead, supervision, general conditions costs, and profit, as reflected in the Cost Breakdown, shall be paid based on percentage complete, with the disbursement of Progress Payments and the Final Payment.

10.1.6.2.5 Developer shall certify that the preliminary schedule of values as submitted to the District is accurate and reflects the costs as developed in preparing Developer's bid. For example, without limiting the foregoing, Contractor shall not "front-load" the preliminary schedule of values with dollar amounts greater than the value of activities performed early in the Project.

10.1.6.2.6 The preliminary schedule of values shall be subject to the District's review and approval of the form and content thereof. In the event that the District objects to any portion of the preliminary schedule of values, the District shall notify the Developer, in writing, of the District's objection(s) to the

preliminary schedule of values. Within five (5) calendar days of the date of the District's written objection(s), Developer shall submit a revised preliminary schedule of values to the District for review and approval. The foregoing procedure for the preparation, review and approval of the preliminary schedule of values shall continue until the District has approved the entirety of the preliminary schedule of values.

10.1.6.2.7 Once the preliminary schedule of values is approved by the District, this shall become the Schedule of Values. The Schedule of Values shall not be thereafter modified or amended by the Developer without the prior consent and approval of the District, which may be granted or withheld in the sole discretion of the District.

10.1.6.3 Schedule of Values

The Developer shall provide for District review and approval prior to commencement of the Work a schedule of values for all of the Work, which includes quantities and prices of items aggregating the Guaranteed Maximum Price and subdivided into component parts as per specifications. The Schedule of Values shall not be modified or amended by the Developer without the prior consent and approval of the District, which may be granted or withheld in the sole discretion of the District. The District shall have the right at any time to revise the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.1.6.4 Preliminary Schedule of Submittals

A preliminary schedule of submittals, including Shop Drawings, Product Data, and Samples submittals. Once approved by District, this shall become the Submittal Schedule. All submittals may be reviewed by District in an electronic PDF format and shall be forwarded to the Architect by the date indicated on the approved Submittal Schedule, unless an earlier date is necessary to maintain the Construction Schedule, in which case those submittals shall be forwarded to the District so as not to delay the Construction Schedule. Upon request by the District, Developer shall provide an electronic copy of all submittals to the District. All submittals shall be submitted no later than ninety (90) days after the Notice to Proceed with Construction.

10.1.6.5 Safety Plan

Developer's Safety Plan specifically adapted for the Project shall comply with the following requirements:

10.1.6.5.1 All applicable requirements of California Division of Occupational Safety and Health ("Cal/OSHA") and/or of the United States Occupational Safety and Health Administration ("OSHA").

10.1.6.5.2 All provisions regarding Project safety, including all applicable provisions in these Construction Provisions.

10.1.6.5.3 Developer's Safety Plan shall be in English and in the language(s) of the Developer's and its Subcontractors' employees.

10.1.6.6 Complete Registered Subcontractor List

The name, address, telephone number, facsimile number, California State Contractors License number, classification, DIR registration number, and monetary value of all Subcontracts of any tier for parties furnishing labor, material, or equipment for completion of the Project.

10.2 Monthly Progress Schedule(s)

10.2.1 Developer shall provide Monthly Progress Schedule(s) to the District. A Monthly Progress Schedule shall update the approved Construction Schedule or the last Monthly Progress Schedule, showing all work completed and to be completed as well as updating the Registered Subcontractors List. The monthly Progress Schedule shall be sent as noted below and, if also requested by District, within the timeframe requested by the District and shall be in a format acceptable to the District and contain a written narrative of the progress of work that month and any changes, delays, or events that may affect the work. The process for District approval of the Monthly Progress Schedule shall be the same as the process for approval of the Construction Schedule.

10.2.2 Developer shall submit Monthly Progress Schedule(s) with all payment applications.

10.2.3 Developer must provide all schedules both in hard copy and electronically, in a format (e.g., Microsoft Project or Primavera) approved in advance by the District.

10.2.4 District will review the schedules submitted and Developer shall make changes and corrections in the schedules as requested by the District and resubmit the schedules until approved by the District.

10.2.5 District shall have the right at any time to discuss with the Developer revisions to the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.2.6 All submittals and schedules must be approved by the District before Developer can rely on them as a basis for payment. District shall use best efforts to approve all submittals and schedules on or before fourteen (14) days after presentation of the same from Developer, providing there are no extenuating circumstances, and no such approval shall be unreasonably withheld by District.

10.3 Material Safety Data Sheets (MSDS)

Developer is required to ensure Material Safety Data Sheets are available in a readily accessible place at the Work Site for any material requiring a Material Safety Data

Sheet per the federal "Hazard Communication" standard, or employees' "right to know" law. The Developer is also required to ensure proper labeling on substances brought onto the job site and that any person working with the material or within the general area of the material is informed of the hazards of the substance and follows proper handling and protection procedures. Two additional copies of the Material Safety Data Sheets shall also be submitted directly to the District.

11. Site Access, Conditions, And Requirements

11.1 Site Investigation

Developer has made a careful investigation of the Site and is familiar with the requirements of the Contract Documents and has accepted the readily observable, existing conditions of the Site.

11.2 Soils Investigation Report

When a soils investigation report obtained from test holes at Site or for the Project is available, that report may be made available to the Developer but shall not be a part of this Contract but shall not alleviate or excuse Developer's obligation to perform its own investigation. Any information obtained from that report or any information given on Drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only, is not guaranteed, does not form a part of this Contract, and Developer may not rely thereon. Developer acknowledges that it has made a visual examination of the Site and has made whatever tests Developer deems appropriate to determine underground condition of soil.

11.3 Access to Work

District and its representatives shall at all times have access to Work wherever it is in preparation or progress, including storage and fabrication. Developer shall provide safe and proper facilities for such access so that District's representatives may perform their functions. District shall provide Developer adequate advance notice for access to active construction zones such that Developer may provide for safety measures to District and representatives.

11.4 Layout and Field Engineering

11.4.1 All field engineering required for layout of this Work and establishing grades for earthwork operations shall be furnished by Developer at its expense. This Work shall be done by a qualified, California-registered civil engineer or licensed land surveyor approved in writing by District and Architect. Any required Record and/or As-Built Drawings of Site development shall be prepared by the approved civil engineer or licensed land surveyor.

11.4.2 The Developer shall be responsible for having ascertained pertinent local conditions such as location, accessibility, and general character of the Site and for having satisfied itself as to the conditions under which the Work is to be performed. District shall not be liable for any claim for allowances because of Developer's error or negligence in acquainting itself with the conditions at the Site.

11.4.3 Developer shall protect and preserve established benchmarks and monuments and shall make no changes in locations without the prior written approval of District. Developer shall replace any benchmarks or monuments that are lost or destroyed subsequent to proper notification of District and with District's approval.

11.5 Utilities

Utilities shall be provided as indicated in the Specifications.

11.6 Sanitary Facilities

Sanitary facilities shall be provided as indicated in the Specifications.

11.7 Surveys

Developer shall provide surveys done by a California-licensed civil engineer or licensed land surveyor to determine locations of construction, grading, and site work as required to perform the Work.

11.8 Regional Notification Center

The Developer, except in an emergency, shall contact the appropriate regional notification center at least two (2) days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement that is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and/or carried out by the Developer unless an inquiry identification number has been assigned to the Developer or any Subcontractor and the Developer has given the District the identification number. Any damages arising from Developer's failure to make appropriate notification shall be at the sole risk and expense of the Developer. Any delays caused by failure to make appropriate notification shall be at the sole risk of the Developer and shall not be considered for an extension of the Contract Time.

11.9 Existing Utility Lines

11.9.1 Pursuant to Government Code section 4215, District assumes the responsibility for removal, relocation, and protection of main or trunk utility lines and facilities located on the construction Site at the time of commencement of construction under the Contract Documents with respect to any such utility facilities that are not identified in the Plans and Specifications. Developer shall not be assessed for liquidated damages for delay in completion of the Project caused by failure of District or the owner of a utility to provide for removal or relocation of such utility facilities.

11.9.2 Locations of existing utilities provided by District shall not be considered exact, but approximate within a reasonable margin and shall not relieve Developer of its responsibilities to exercise reasonable care and to pay all costs of repair due to Developer's failure to do so. District shall compensate Developer for the costs of locating, repairing damage not due to the failure of Developer to exercise reasonable care, and removing or relocating such utility

facilities not indicated in the Plans and Specifications with reasonable accuracy, and for equipment necessarily idle during such work.

11.9.3 No provision herein shall be construed to preclude assessment against Developer for any other delays in completion of the Work. Nothing in this Article shall be deemed to require District to indicate the presence of existing service laterals, appurtenances, or other utility lines, within the exception of main or trunk utility lines. Whenever the presence of these utilities on the Site of the construction Project can be inferred from the presence of other visible facilities, such as buildings, meter junction boxes, on or adjacent to the Site of the construction.

11.9.4 If Developer, while performing Work under this Contract, discovers utility facilities not identified by District in Contract Plans and Specifications, Developer shall immediately notify the District and the utility in writing. In the event Developer fails to immediately provide notice and subsequently causes damage to the utility facilities, the cost of repair for damage to above-mentioned visible facilities shall be borne by the Developer.

11.10 Notification

Developer understands, acknowledges and agrees that the purpose for prompt notification to the District pursuant to these provisions is to allow the District to investigate the condition(s) so that the District shall have the opportunity to decide how the District desires to proceed as a result of the condition(s). Accordingly, failure of Developer to promptly notify the District in writing, pursuant to these provisions, shall constitute Developer's waiver of any claim for damages or delay incurred as a result of the condition(s).

11.11 Hazardous Materials

Developer shall comply with all provisions and requirements of the Contract Documents related to hazardous materials including, without limitation, Hazardous Materials Procedures and Requirements.

11.12 No Signs

Neither the Developer nor any other person or entity shall display any signs not required by law or the Contract Documents at the Site, fences, trailers, offices, or elsewhere on the Site without specific prior written approval of the District.

12. Trenches

12.1 Trenches Greater Than Five Feet

Pursuant to Labor Code section 6705, if the Guaranteed Maximum Price exceeds \$25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Developer shall, in advance of excavation, promptly submit to the District and/or a registered civil or structural engineer employed by the District or Architect, a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

12.2 Excavation Safety

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the District or by the person to whom authority to accept has been delegated by the District.

12.3 No Tort Liability of District

Pursuant to Labor Code section 6705, nothing in this Article shall impose tort liability upon the District or any of its employees.

12.4 No Excavation without Permits

The Developer shall not commence any excavation Work until it has secured all necessary permits including the required CalOSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

12.5 Discovery of Hazardous Waste and/or Unusual Conditions

12.5.1 Pursuant to Public Contract Code section 7104, if the Work involves digging trenches or other excavations that extend deeper than four feet below the Surface, the Developer shall promptly, and before the following conditions are disturbed, notify the District, in writing, of any:

12.5.1.1 Material that the Developer believes may be material that is hazardous waste, as defined in section 25117 of the Health and Safety Code, is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

12.5.1.2 Subsurface or latent physical conditions at the Site differing from those indicated.

12.5.1.3 Unknown physical conditions at the Project Site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

12.5.2 The District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Developer's cost of, or the time required for, performance of any part of the Work, shall issue a Change Order under the procedures described herein.

12.5.3 In the event that a dispute arises between District and the Developer whether the conditions materially differ or cause a decrease or increase in the Developer's cost of, or time required for, performance of any part of the Work, the Developer shall not be excused from any scheduled completion date provided for by the Contract Documents, but shall proceed with all work to be performed under the Contract Documents. The Developer shall retain any and

all rights provided either by the Contract Documents or by law that pertain to the resolution of disputes and protests.

13. Insurance and Bonds

13.1 Developer's Insurance

The Developer shall comply with the insurance requirements as indicated in the Facilities Lease.

13.2 Contract Security – Bonds

13.2.1 Developer shall furnish two surety bonds issued by a California admitted surety insurer as follows:

13.2.1.1 Performance Bond

A bond in an amount at least equal to one hundred percent (100%) of Guaranteed Maximum Price as security for faithful performance of the Contract Documents.

13.2.1.2 Payment Bond

A bond in an amount at least equal to one hundred percent (100%) of the Guaranteed Maximum Price as security for payment of persons performing labor and/or furnishing materials in connection with this Contract.

13.2.2 Cost of bonds shall be included in the Guaranteed Maximum Price.

13.2.3 All bonds related to this Project shall be in the forms set forth in these Contract Documents and shall comply with all requirements of the Contract Documents, including, without limitation, the bond forms.

14. Warranty/Guarantee/Indemnity

14.1 Warranty/Guarantee

14.1.1 The Developer shall obtain and preserve for the benefit of the District, manufacturer's warranties on materials, fixtures, and equipment incorporated into the Work.

14.1.2 In addition to guarantees and warranties required elsewhere, Developer shall, and hereby does guarantee and warrant all Work furnished on the job against all defects for a period of TWO (2) years after the later of the following dates, unless a longer period is provided for in the Contract Documents:

14.1.2.1 The acceptance by the District's governing board of the Work, subject to these General Conditions, or

14.1.2.2 The date that commissioning for the Project, if any, was completed.

14.1.3 If any work is not in compliance with the Drawings and Specifications, Developer shall repair or replace any and all of that Work, together with any other Work that may be displaced in so doing, that may prove defective in workmanship and/or materials within a TWO (2) year period from date of completion as defined above, unless a longer period is provided for in the Contract Documents, without expense whatsoever to District.

14.1.4 In the event of failure of Developer and/or Surety to commence and pursue with diligence said replacements or repairs within ten (10) days after being notified in writing, Developer and Surety hereby acknowledge and agree that District is authorized to proceed to have defects repaired and made good at expense of Developer and/or Surety who hereby agree to pay costs and charges therefore immediately on demand.

14.1.5 If any work is not in compliance with the Drawings and Specifications and if in the opinion of District said defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to District or to prevent interruption of operations of District, District will attempt to give the notice required above. If Developer or Surety cannot be contacted or neither complies with District's request for correction within a reasonable time as determined by District, District may, notwithstanding the above provision, proceed to make any and all corrections and/or provide attentions the District believes are necessary. The costs of correction or attention shall be charged against Developer and Surety of the guarantees or warranties provided in this Article or elsewhere in this Agreement.

14.1.6 The above provisions do not in any way limit the guarantees or warranties on any items for which a longer guarantee or warranty is specified or on any items for which a manufacturer gives a guarantee or warranty for a longer period. Developer shall furnish to District all appropriate guarantee or warranty certificates as indicated in the Specifications or upon request by District.

14.1.7 Nothing herein shall limit any other rights or remedies available to District.

14.2 Indemnity

Developer shall indemnify the District as indicated in the Facilities Lease.

15. Time

15.1 Notice to Proceed with Construction

15.1.1 District may issue a Notice to Proceed with Construction within ninety (90) days from the date of the Notice of Award after Guaranteed Maximum Price. Once Developer has received the Notice to Proceed with Construction, Developer shall complete the Work within the period of time indicated in the Contract Documents.

15.1.2 In the event that the District desires to postpone issuing the Notice to Proceed with Construction beyond ninety (90) days from the date of the Notice of Award after Guaranteed Maximum Price, it is expressly understood that with

reasonable notice to the Developer, the District may postpone issuing the Notice to Proceed with Construction. It is further expressly understood by Developer that Developer shall not be entitled to any claim of additional compensation as a result of the postponement of the issuance of the Notice to Proceed with Construction.

15.1.3 If the Developer believes that a postponement of issuance of the Notice to Proceed with Construction will cause a hardship to Developer, Developer may terminate the Contract. Developer's termination due to a postponement shall be by written notice to District within ten (10) days after receipt by Developer of District's notice of postponement. It is further understood by Developer that in the event that Developer terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Developer for the Work that Developer had performed at the time of notification of postponement.

15.2 Computation of Time / Adverse Weather

15.2.1 The Developer will only be allowed a time extension for Adverse Weather conditions if requested by Developer in compliance with the time extension request procedures and only if all of the following conditions are met:

15.2.1.1 The weather conditions constitute Adverse Weather, as defined herein;

15.2.1.2 Developer can verify that the Adverse Weather caused delays in excess of five (5) hours of the indicated labor required to complete the scheduled tasks of Work on the day affected by the Adverse Weather;

15.2.1.3 The Developer's crew is dismissed as a result of the Adverse Weather;

15.2.1.4 Said delay adversely affect the critical path in the Construction Schedule; and

15.2.1.5 Exceeds twelve (12) days of delay per year.

15.2.2 If the aforementioned conditions are met, a non-compensable day-for-day extension will only be allowed for those days in excess of those indicated herein.

15.2.3 The Developer shall work seven (7) days per week, if necessary, irrespective of inclement weather, to maintain access and the Construction Schedule, and to protect the Work under construction from the effects of Adverse Weather, all at no further cost to the District.

15.2.4 The Contract Time has been determined with consideration given to the average climate weather conditions prevailing in the County in which the Project is located.

15.3 Hours of Work

15.3.1 Sufficient Forces

Developer and Subcontractors shall continuously furnish sufficient and competent work forces with the required levels of familiarity with the Project and skill, training and experience to ensure the prosecution of the Work in accordance with the Construction Schedule.

15.3.2 Performance During Working Hours

Work shall be performed during regular working hours as permitted by the appropriate governmental agency except that in the event of an emergency, or when required to complete the Work in accordance with job progress, Work may be performed outside of regular working hours with the advance written consent of the District and approval of any required governmental agencies.

15.3.3 No Work during State Testing

Developer shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-required tests. The District or District's Representative will provide Developer with a schedule of test dates concurrent with the District's issuance of the Notice to Proceed with Construction, or as soon as test dates are made available to the District.

15.4 Progress and Completion

15.4.1 Time of the Essence

Time limits stated in the Contract Documents are of the essence to the Contract Documents. By executing the Facilities Lease, the Developer confirms that the Contract Time is a reasonable period for performing the Work.

15.4.2 No Commencement Without Insurance or Bonds

The Developer shall not commence operations on the Project or elsewhere prior to the effective date of insurance and bonds. The date of commencement of the Work shall not be changed by the effective date of such insurance or bonds. If Developer commences Work without insurance and bonds, all Work is performed at Developer's peril and shall not be compensable until and unless Developer secures bonds and insurance pursuant to the terms of the Contract Documents and subject to District claim for damages.

15.5 Schedule

Developer shall provide to District, Construction Manager, and Architect a schedule in conformance with the Contract Documents and as required in these Construction Provisions.

15.6 Expeditious Completion

The Developer shall proceed expeditiously with adequate forces and shall achieve Completion within the Contract Time.

16. Extensions of Time – Liquidated Damages

16.1 Liquidated Damages

Developer and District hereby agree that the exact amount of damages for failure to complete the Work within the time specified is extremely difficult or impossible to determine. If the Work is not complete within the time specified in the Contract Documents, it is understood that the District will suffer damage. It being impractical and unfeasible to determine the amount of actual damage, it is agreed the Developer shall pay to District as fixed and liquidated damages, and not as a penalty, the amount set forth in the Facilities Lease for each calendar day of delay in Completion. Developer and its Surety shall be liable for the amount thereof pursuant to Government Code section 53069.85.

16.2 Excusable Delay

16.2.1 Developer shall not be charged for liquidated damages because of any delays in completion of Work which are not the fault of Developer or its Subcontractors, including without limitation acts of God as defined in Public Contract Code section 7105, acts of enemy, epidemics, and quarantine restrictions. Developer shall, within five (5) calendar days of beginning of any delay, notify District in writing of causes of delay including documentation and facts explaining the delay and the direct correlation between the cause and effect. District shall review the facts and extent of any delay and shall grant extension(s) of time for completing Work when, in its judgment, the findings of fact justify an extension. Extension(s) of time shall apply only to that portion of Work affected by delay, and shall not apply to other portions of Work not so affected. An extension of time may only be granted if Developer has timely submitted the Construction Schedule as required herein.

16.2.2 Developer shall notify the District pursuant to the claims provisions in these Construction Provisions of any anticipated delay and its cause. Following submission of a claim, the District may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the Work might be delayed thereby.

16.2.3 In the event the Developer requests an extension of Contract Time for unavoidable delay as set forth in subparagraph 16.2.1, such request shall be submitted in accordance with the provisions in the Contract Documents governing changes in Work. When requesting time, requests must be submitted with full justification and documentation. If the Developer fails to submit justification, it waives its right to a time extension at a later date. Such justification must be based on the official Construction Schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the Scope of Work. Any claim for delay must include the following information as support, without limitation:

16.2.3.1 The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform the activities within the stated duration.

16.2.3.2 Specific logical ties to the Contract Schedule for the proposed changes and/or delay showing the activity/activities in the Construction Schedule that are affected by the change and/or delay. In particular, Developer must show an actual impact to the schedule, after making a good faith effort to mitigate the delay by rescheduling the work, by providing an analysis of the schedule ("Schedule Analysis"). Such Schedule Analysis shall describe in detail the cause and effect of the delay and the impact on the critical dates in the Project schedule. (This information must be provided for any portion of any delay of seven (7) days or more.)

16.2.3.3 A recovery schedule must be submitted within twenty (20) calendar days of written notification to the District of causes of delay.

16.3 No Additional Compensation for Delays within Developer's Control

16.3.1 Developer is aware that governmental agencies and utilities, including, without limitation, the Division of the State Architect, the Department of General Services, gas companies, electrical utility companies, water districts, and other agencies may have to approve Developer-prepared drawings or approve a proposed installation. Accordingly, Developer has included in the Guaranteed Maximum Price, time for possible review of its drawings and for reasonable delays and damages that may be caused by such agencies, including without limitation delays due to California Environmental Quality Act ("CEQA") compliance. Thus, Developer is not entitled to make a claim for damages for delays arising from the review of Developer's drawings.

16.3.1.1 Developer shall only be entitled to compensation for delay when all of the following conditions are met:

16.3.1.1.1 The District is responsible for the delay.

16.3.1.1.2 The delay is unreasonable under the circumstances involved.

16.3.1.1.3 The delay could not have been avoided or mitigated by reasonable diligence; and

16.3.1.1.4 Developer timely complies with the claims procedure of the Contract Documents.

16.4 Float or Slack in the Schedule

Float or slack is the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any of the activities in the schedule. Float or slack is not for the exclusive use of or benefit of either the District or the Developer, but its use shall be determined solely by the District.

17. Changes in the Work

17.1 No Changes without Prior Authorization

17.1.1 There shall be no change whatsoever in the Drawings, Specifications, or in the Work without an executed Change Order or a written Construction Change Directive authorized by the District as herein provided. District shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the District's governing board has authorized the same and the cost thereof has been approved in writing by Change Order or Construction Change Directive in advance of the changed Work being performed. No extension of time for performance of the Work shall be allowed hereunder unless a request for such extension is made at the time changes in the Work are ordered, and such time duly adjusted and approved in writing in the Change Order or Construction Change Directive. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications.

17.1.2 Developer shall perform immediately all work that has been authorized by a fully executed Change Order or Construction Change Directive. Developer shall be fully responsible for any and all delays and/or expenses caused by Developer's failure to expeditiously perform this Work.

17.1.3 Should any Change Order result in an increase in the Guaranteed Maximum Price or extend the Contract Time, the cost of or length of extension in that Change Order shall be agreed to, in writing, by the District in advance of the work by Developer. In the event that Developer proceeds with any change in Work without a Change Order executed by the District or Construction Change Directive, Developer waives any claim of additional compensation or time for that additional work. Under no circumstances shall Developer be entitled to any claim of additional compensation or time not expressly requested by Developer in a Proposed Change Order or approved by District in an executed Change Order.

17.1.4 Developer understands, acknowledges, and agrees that the reason for District authorization is so that District may have an opportunity to analyze the Work and decide whether the District shall proceed with the Change Order or alter the Project so that a change in Work becomes unnecessary.

17.2 Architect Authority

The Architect will have authority to order minor changes in the Work not involving any adjustment in the Guaranteed Maximum Price, or an extension of the Contract Time, or a change that is inconsistent with the intent of the Contract Documents. These changes shall be effected by written Change Order, Construction Change Directive, or by Architect's response(s) to RFI(s), or by Architect's Supplemental Instructions ("ASI").

17.3 Change Orders

A Change Order is a written instrument prepared and issued by the District and/or the Architect and signed by the District (as authorized by the District's Board of Education),

the Developer, the Architect, and approved by the Project Inspector (if necessary) and DSA (if necessary), stating their agreement regarding all of the following:

17.3.1 A description of a change in the Work.

17.3.1.1 The amount of the adjustment in the Guaranteed Maximum Price, if any; and

17.3.1.2 The extent of the adjustment in the Contract Time, if any.

17.3.2 Changes in Guaranteed Maximum Price

A Change Order Request ("COR") shall include breakdowns pursuant to the provisions herein to validate any change in Guaranteed Maximum Price.

17.3.3 Unknown and/or Unforeseen Conditions

If there is an Allowance, then Developer must submit a Request for Allowance Expenditure Directive, including supporting documentation as described below, to receive authorization for the release of funds from the Allowance. If cost of the unforeseen condition(s) exceed the Allowance, Developer must submit a COR requesting an increase in Guaranteed Maximum Price and/or Contract Time that is based at least partially on Developer's assertion that Developer has encountered unknown and/or unforeseen condition(s) on the Project, then Developer shall base the COR on provable information that, to the District's satisfaction, demonstrates that the unknown and/or unforeseen condition(s) were actually unknown and/or unforeseen and that the condition(s) were reasonably unknown and/or unforeseen. If not, the District shall deny the COR and the Developer shall complete the Project without any increase in Guaranteed Maximum Price and/or Contract Time based on that COR.

17.4 Proposed Change Order

17.4.1 Definition of Proposed Change Order

A Proposed Change Order ("PCO") is a written request prepared by the Developer requesting that the District and the Architect issue a Change Order based upon a proposed change to the Work, to the Guaranteed Maximum Price, and/or to the Contract Time.

17.4.2 Changes in Guaranteed Maximum Price

A PCO shall include breakdowns and backup documentation pursuant to the provisions herein and sufficient, in the District's judgment, to validate any change in Guaranteed Maximum Price. In no case shall Developer or any of its Subcontractors be permitted to reserve rights for additional compensation for Change Order Work.

17.4.3 Changes in Time

A PCO shall also include any changes in time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Construction

Schedule as defined in the Contract Documents. Developer shall justify the proposed change in time by submittal of a schedule analysis that accurately shows the impact of the change on the critical path of the Construction Schedule ("Time Impact Analysis"). If Developer fails to request a time extension in a PCO, including the Time Impact Analysis, then the Developer is thereafter precluded from requesting, and waives any right to request, additional time and/or claiming a delay. In no case shall Developer or any of its Subcontractors be permitted to reserve rights for additional time for Change Order Work. A PCO that leaves the amount of time requested blank, or states that such time requested is "to be determined", is not permitted and shall also constitute a waiver of any right to request additional time and/or claim a delay.

17.4.4 Unknown and/or Unforeseen Conditions

If Developer submits a PCO requesting an increase in Guaranteed Maximum Price and/or Contract Time that is based at least partially on Developer's assertion that Developer has encountered unknown and/or unforeseen condition(s) on the Project, then Developer shall base the PCO on provable information that, beyond a reasonable doubt and to the District's satisfaction, demonstrates that the unknown and/or unforeseen condition(s) were actually unknown and/or unforeseen. If not, the District shall deny the PCO as unsubstantiated, and the Developer shall complete the Project without any increase in Guaranteed Maximum Price and/or Contract Time based on that PCO.

17.5 Time to Submit Proposed Change Order

Developer shall submit its PCO within five (5) working days of the date Developer discovers, or reasonably should have discovered, the circumstances giving rise to the PCO, unless additional time to submit a PCO is granted in writing by the District. Time is of the essence in Developer's submission of PCOs so that the District can promptly investigate the basis for the PCO. Accordingly, if Developer fails to submit its PCO within this timeframe, Developer waives, releases, and discharges any right to assert or claim any entitlement to an adjustment of the Contract Price and/or Time based on circumstances giving rise to the PCO.

17.6 Proposed Change Order Certification

In submitting a PCO, Developer certifies and affirms that the cost and/or time request is submitted in good faith, that the cost and/or time request is accurate and in accordance with the provisions of the Contract Documents, and the Developer submits the cost and/or request for extension of time recognizing the significant civil penalties and treble damages which follow from making a false claim or presenting a false claim under Government Code section 12650 et seq.

17.7 Format for Proposed Change Order

17.7.1 The format at section 17.7 shall be used as applicable by the District and the Developer (e.g. Change Orders, PCOs) to communicate proposed additions and/or deductions to the Contract, supported by attached documentation.

17.7.2 Labor

Developer shall be compensated for the costs of labor actually and directly utilized in the performance of the Work. Such labor costs shall be limited to field labor for which there is a prevailing wage rate classification. Wage rates for labor shall not exceed the prevailing wage rates in the locality of the Site and shall be in the labor classification(s) necessary for the performance of the Work. Labor costs shall exclude costs incurred by the Developer in preparing estimate(s) of the costs of the change in the Work, in the maintenance of records relating to the costs of the change in the Work, coordination and assembly of materials and information relating to the change in the Work or performance thereof, or the supervision and other overhead and general conditions costs associated with the change in the Work or performance thereof.

17.7.3 Materials

Developer shall be compensated for the costs of materials necessarily and actually used or consumed in connection with the performance of the change in the Work. Costs of materials may include reasonable costs of transportation from a source closest to the Site of the Work and delivery to the Site. If discounts by material suppliers are available for materials necessarily used in the performance of the change in the Work, they shall be credited to the District. If materials necessarily used in the performance of the change in the Work are obtained from a supplier or source owned in whole or in part by the Developer, compensation therefor shall not exceed the current wholesale price for such materials. If, in the reasonable opinion of the District, the costs asserted by the Developer for materials in connection with any change in the Work are excessive, or if the Developer fails to provide satisfactory evidence of the actual costs of such materials from its supplier or vendor of the same, the costs of such materials and the District's obligation to pay for the same shall be limited to the then lowest wholesale price at which similar materials are available in the quantities required to perform the change in the Work. The District may elect to furnish materials for the change in the Work, in which event the Developer shall not be compensated for the costs of furnishing such materials or any mark-up thereon.

17.7.4 Equipment

As a precondition to the District's duty to pay for Equipment rental or loading and transportation, Developer shall provide satisfactory evidence of the actual costs of Equipment from the supplier, vendor or rental agency of same. Developer shall be compensated for the actual cost of the necessary and direct use of Equipment in the performance of the change in the Work. Use of Equipment in the performance of the change in the Work shall be compensated in increments of fifteen (15) minutes. Rental time for Equipment moved by its own power shall include time required to move the Equipment to the site of the Work from the nearest available rental source of the same. If Equipment is not moved to the Site by its own power, Developer will be compensated for the loading and transportation costs in lieu of rental time. The foregoing notwithstanding, neither moving time or loading and transportation time shall be allowed if the Equipment is used for performance of any portion of the Work other than the change in the Work. Unless prior approval in writing is obtained

by the Developer from the Architect, the Project Inspector, the Construction Manager and the District, no costs or compensation shall be allowed for time while Construction Equipment is inoperative, idle or on standby, for any reason. Developer shall not be entitled to an allowance or any other compensation for Equipment or tools used in the performance of a change in the Work where the Equipment or tools have a replacement value of \$500.00 or less. Equipment costs claimed by the Developer in connection with the performance of any Work shall not exceed rental rates established by distributors or construction equipment rental agencies in the locality of the Site; any costs asserted which exceed such rental rates shall not be allowed or paid. Unless otherwise specifically approved in writing by the Architect, the Project Inspector, Construction Manager and the District, the allowable rate for the use of Equipment in connection with the Work shall constitute full compensation to the Developer for the cost of rental, fuel, power, oil, lubrication, supplies, necessary attachments, repairs or maintenance of any kind, depreciation, storage, insurance, labor (exclusive of labor costs of the Equipment operator), and any and all other costs incurred by the Developer incidental to the use of the Equipment.

17.7.5 Overhead and Profit.

The phrase "Overhead and Profit" shall include field and office supervisors and assistants, watchperson, use of small tools, consumable, insurance other than construction bonds and insurance required herein, and general field and home office expenses.

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17.8 Format for Change Order Request and Proposed Change Order

The following format shall be used as applicable by the District and the Developer (e.g. Change Orders, PCO's) to communicate proposed additions and deductions to the Contract Documents, supported by attached documentation. Any spaces left blank will be deemed no change to cost or time.

	SUBCONTRACTOR PERFORMED WORK	ADD	DEDUCT
(a)	Material (attach supplier's invoice or itemized quantity and unit cost plus sales tax)		
(b)	Add Labor (attach itemized hours and rates, fully encumbered)		
(c)	Add Equipment (attach suppliers' invoice)		
(d)		Subtotal	
(e)	Add Subcontractor's overhead and profit , not to exceed ten percent (10%) of Item (d)		
(f)		Subtotal	
(g)	Add Developer's overhead and profit , not to exceed five percent (5%) of Item (f)		
(h)		Subtotal	
(i)	Add Bond and Insurance , not to exceed three-quarter percent (.75%) of Item (h)		
(j)		TOTAL	
(k)	Time (zero unless indicated; "TBD" not permitted)		___ Calendar Days

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DEVELOPER PERFORMED WORK

- (a) **Material** (attach supplier's invoice or itemized quantity and unit cost plus sales tax)
 - (b) **Add Labor** (attach itemized hours and rates, fully encumbered)
 - (c) **Add Equipment** (attach suppliers' invoice)
 - (d) **Subtotal**
 - (e) **Add Developer's overhead and profit**, not to exceed fifteen percent (15%) of **Item (d)**.
 - (f) **Subtotal**
 - (g) **Add Bond and Insurance**, not to exceed three-quarter percent (.75%) of **Item (h)**
 - (h) **TOTAL**
 - (i) **Time** (zero unless indicated; "TBD" not permitted) **Calendar Days**
-

17.9 Change Order Certification

17.9.1 All Change Orders, CORs, and PCOs must include the following certification by the Developer:

The undersigned Developer approves the foregoing as to the changes, if any, and to the Guaranteed Maximum Price specified for each item and as to the extension of time allowed, if any, for completion of the entire Work as stated herein, and agrees to furnish all labor, materials, and service, and perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of sums which have no basis in fact or which Developer knows are false are at the sole risk of Developer and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq. and U.S. Criminal Code, 18 U.S.C. § 1001. It is understood that the changes herein to the Contract Documents shall only be effective when approved by the governing board of the District.

It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Developer's costs and expenses, both direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project. Developer is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

17.10 Determination of Change Order Cost

17.10.1 The amount of the increase or decrease in the Guaranteed Maximum Price from a Change Order, if any, shall be determined in one or more of the following ways as applicable to a specific situation and at the District's discretion:

17.10.1.1 District acceptance of a COR or PCO.

17.10.1.2 By amounts contained in Developer's schedule of values, if applicable.

17.10.1.3 By agreement between District and Developer.

17.11 Deductive Change Orders

All deductive Change Order(s) must be prepared pursuant to the provisions herein. Where a portion of the Work is deleted from the Contract, the reasonable value of the deleted work less the value of any new work performed shall be considered the appropriate deduction. The value submitted on the Schedule of Values shall be used to calculate the credit amount unless the bid documentation is being held in escrow as part of the Contract Documents. If Developer offers a proposed amount for a deductive Change Order(s) for work performed, Developer shall include a credit for total profit and overhead less proof of expended costs related to the deleted work with the Change Order(s). Any deviation from this provision shall not be allowed.

17.12 Addition or Deletion of Alternate Bid Item(s)

17.12.1 If a subcontractor's Bid Form and Proposal includes proposal(s) for Alternate Bid Item(s), during Developer's performance of the Work, the District may elect to add or delete any such Alternate Bid Item(s) if not included in the Contract at the time of award. If the District elects to add or delete Alternate Bid Item(s) after Contract award, the cost or credit for such Alternate Bid Item(s) shall be as set forth in the Bid Form and Proposal unless the parties agree to a different price and the Contract Time shall be adjusted by the number of days allocated in the Contract Documents.

17.12.2 For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Developer, and the Developer shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Developer's cost in determining the actual cost of construction for purposes of any change, addition, or omission in the Work as provided herein.

17.13 Construction Change Directives

17.13.1 A Construction Change Directive is a written order prepared and issued by the District, the Construction Manager, and/or the Architect and signed by the District and the Architect, directing a change in the Work. The District may, as provided by law, by Construction Change Directive and without invalidating the Contract, order changes in the Work consisting of additions,

deletions, or other revisions. The adjustment to the Guaranteed Maximum Price or Contract Time, if any, is subject to the provision of this section regarding Changes in the Work. If all or a portion of the Project is being funded by funds requiring approval by the State Allocation Board ("SAB"), these revisions may be subject to compensation once approval of same is received and funded by the SAB, and funds are released by the Office of Public School Construction ("OPSC"). Any dispute as to the adjustment of the Guaranteed Maximum Price, if any, of the Construction Change Directive or timing of payment shall be resolved pursuant to the Payment and Claims and Disputes provisions herein.

17.13.2 The District may issue a Construction Change Directive in the absence of agreement on the terms of a Change Order.

17.14 Force Account Directives

17.14.1 When work, for which a definite price has not been agreed upon in advance, is to be paid for on a force account basis, all direct costs necessarily incurred and paid by the Developer for labor, material, and equipment used in the performance of that Work, shall be subject to the approval of the District and compensation will be determined as set forth herein.

17.14.2 The District will issue a Force Account Directive to proceed with the Work on a force account basis, and a not-to-exceed budget will be established by the District.

17.14.3 All requirements regarding direct cost for labor, labor burden, material, equipment, and markups on direct costs for overhead and profit described in this section shall apply to Force Account Directives. However, the District will only pay for actual costs verified in the field by the District or its authorized representative(s) on a daily basis.

17.14.4 The Developer shall be responsible for all costs related to the administration of Force Account Directives. The markup for overhead and profit for Developer modifications shall be full compensation to the Developer to administer Force Account Directives, and Developer shall not be entitled to separately recover additional amounts for overhead and/or profit.

17.14.5 The Developer shall notify the District or its authorized representative(s) at least twenty-four (24) hours prior to proceeding with any of the force account work. Furthermore, the Developer shall notify the District when it has consumed eighty percent (80%) of the budget, and shall not exceed the budget unless specifically authorized in writing by the District. The Developer will not be compensated for force account work in the event that the Developer fails to timely notify the District regarding the commencement of force account work, or exceeding the force account budget.

17.14.6 The Developer shall diligently proceed with the work, and on a daily basis, submit a daily force account report no later than 5:00 p.m. each day on a form supplied by the District. The report shall contain a detailed itemization of the daily labor, material, and equipment used on the force account work only. The names of the individuals performing the force account work shall be included on the daily force account reports. The type and model of equipment

shall be identified and listed. The IOR or District representative will review the information contained in the reports, and sign the reports no later than the next work day, and return a copy of the report to the Developer for its records. The District will not sign, nor will the Developer receive compensation for, work the District cannot verify. The Developer will provide a weekly force account summary indicating the status of each Force Account Directive in terms of percent complete of the not-to-exceed budget and the estimated percent complete of the work

17.14.7 In the event the Developer and the District reach a written agreement on a set cost for the work while the work is proceeding based on a Force Account Directive, the Developer's signed daily force account reports shall be discontinued and all previously signed reports shall be invalid.

17.15 Price Request

17.15.1 Definition of Price Request

A Price Request ("PR") is a written request prepared by the Architect or Construction Manager requesting the Developer submit to the District, the Construction Manager and the Architect an estimate of the effect of a proposed change in the Work on the Guaranteed Maximum Price and the Contract Time.

17.15.2 Scope of Price Request

A Price Request shall contain adequate information, including any necessary Drawings and Specifications, to enable Developer to provide the cost breakdowns required. The Developer shall not be entitled to any additional compensation for preparing a response to a Price Request, whether ultimately accepted or not.

17.16 Accounting Records

With respect to portions of the Work performed by Change Orders and Construction Change Directives, the Developer shall keep and maintain cost-accounting records satisfactory to the District, including, without limitation, Job Cost Reports as provided in these General Conditions, which shall be available to the District on the same terms as any other books and records the Developer is required to maintain under the Contract Documents. Such records shall include without limitation hourly records for Labor and Equipment and itemized records of materials and Equipment used that day in connection with the performance of any Work. All records maintained hereunder shall be subject to inspection, review and/or reproduction by the District, the Construction Manager and the Architect or the Project Inspector upon request. In the event that the Developer fails or refuses, for any reason, to maintain or make available for inspection, review and/or reproduction such records, the District's determination of the extent of adjustment to the Contract Price shall be final, conclusive, dispositive and binding upon Developer.

17.17 Notice Required

If the Developer desires to make a claim for an increase in the Guaranteed Maximum Price, or any extension in the Contract Time for completion, it shall notify the District pursuant to the provisions herein, including the Article on Claims and Disputes. No

claim shall be considered unless made in accordance with this subparagraph. Developer shall proceed to execute the Work even though the adjustment may not have been agreed upon. Any change in the Guaranteed Maximum Price or extension of the Contract Time resulting from such claim shall be authorized by a Change Order.

17.18 Applicability to Subcontractors

Any requirements under this Article shall be equally applicable to Change Orders or Construction Change Directives issued to Subcontractors by the Developer to the extent required by the Contract Documents.

17.19 Alteration to Change Order Language

Developer shall not alter Change Orders or reserve time in Change Orders. Change Orders altered in violation of this provision, if in conflict with the terms set forth herein, shall be construed in accordance with the terms set forth herein. Developer shall execute finalized Change Orders and proceed under the provisions herein with proper notice.

17.20 Failure of Developer to Execute Change Order

Developer shall be in default of the Contract Documents if Developer fails to execute a Change Order when the Developer agrees with the addition and/or deletion of the Work in that Change Order.

18. Requests For Information

18.1 Any Request for Information shall reference all applicable Contract Document(s), including Specification section(s), detail(s), page number(s), drawing number(s), and sheet number(s), etc. The Developer shall make suggestions and interpretations of the issue raised by each Request for Information. A Request for Information cannot modify the Guaranteed Maximum Price, Contract Time, or the Contract Documents.

18.2 The Developer may be responsible for any costs incurred for professional services that District may deduct from any amounts owing to the Developer, if a Request for Information requests an interpretation or decision of a matter where the information sought is equally available to the party making the request. District may deduct from and/or invoice Developer for professional services arising therefrom.

19. Payments

19.1 Guaranteed Maximum Price

As compensation for Developer's construction of the Project, the District shall pay Developer pursuant to the terms of Exhibit "C" to the Facilities Lease. This is the total amount payable by the District to the Developer for performance of the Work under the Contract.

19.2 Applications for Tenant Improvement Payments

19.2.1 Procedure for Applications for Tenant Improvement Payments

19.2.1.1 Not before the fifth (5th) day of each calendar month during the progress of the Work, Developer shall submit to the District and the Architect an itemized Application for Payment for operations completed in accordance with the Schedule of Values. Such application shall be on a form approved by the District and shall be notarized, if required, and supported by the following or each portion thereof unless waived by the District in writing:

19.2.1.1.1 The amount paid to the date of the Application for Payment to the Developer, to all its Subcontractors, and all others furnishing labor, material, or equipment under the Contract Documents.

19.2.1.1.2 The amount being requested under the Application for Payment by the Developer on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract Documents.

19.2.1.1.3 The balance that will be due to each of such entities after said payment is made.

19.2.1.1.4 A certification that the As-Built Drawings and annotated Specifications are current.

19.2.1.1.5 Itemized breakdown of work done for the purpose of requesting partial payment.

19.2.1.1.6 An updated and acceptable construction schedule in conformance with the provisions herein.

19.2.1.1.7 The additions to and subtractions from the Guaranteed Maximum Price and Contract Time.

19.2.1.1.8 A total of the retentions held.

19.2.1.1.9 Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the District may require from time to time.

19.2.1.1.10 The percentage of completion of the Developer's Work by line item.

19.2.1.1.11 Schedule of Values updated from the preceding Application for Payment.

19.2.1.1.12 A duly completed and executed conditional waiver and release upon Tenant Improvement Payment compliant with Civil Code section 8132 from the Developer and each

subcontractor of any tier and supplier to be paid from the current Tenant Improvement Payment.

19.2.1.1.13 A duly completed and executed unconditional waiver and release upon Tenant Improvement Payment compliant with Civil Code section 8134 from the Developer and each subcontractor of any tier and supplier that was paid from the previous Tenant Improvement Payment submitted 60 days prior; and

19.2.1.1.14 A certification by the Developer of the following:

The Developer warrants title to all Work performed as of the date of this payment application and that all such Work has been completed in accordance with the Contract Documents for the Project. The Developer further warrants that all Work performed as of the date of this payment application is free and clear of liens, claims, security interests, or encumbrances in favor of the Developer, Subcontractors, material and equipment suppliers, workers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work, except those of which the District has been informed. Submission of sums which have no basis in fact or which Developer knows are false are at the sole risk of Developer and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq.

19.2.1.1.15 The Developer shall be subject to the False Claims Act set forth in Government Code section 12650 et seq. for information provided with any Application for Tenant Improvement Payments.

19.2.1.1.16 All remaining certified payroll records ("CPR(s)") for each journeyman, apprentice, worker, or other employee employed by the Developer and/or each Subcontractor in connection with the Work for the period of the Application for Payment. As indicated herein, the District shall not make any payment to Developer until:

19.2.1.1.16.1 Developer and/or its Subcontractor(s) provide electronic CPRs weekly for all weeks any journeyman, apprentice, worker or other employee was employed in connection with the Work directly to the DIR, or within ten (10) days of any request by the District or the DIR; and

19.2.1.1.16.2 Any delay in Developer and/or its Subcontractor(s) providing CPRs in a timely manner may directly delay the Developer's payment.

19.2.1.1.17 Applications received after June 20th will not be paid until the second week of July and applications received after December 12th will not be paid until the first week of January.

19.2.2 Prerequisites for Tenant Improvement Payments

19.2.2.1 First Payment Request

The following items, if applicable, must be completed before the District will accept and/or process the Developer's first payment request:

19.2.2.1.1 Installation of the Project sign.

19.2.2.1.2 Installation of field office.

19.2.2.1.3 Installation of temporary facilities and fencing.

19.2.2.1.4 Schedule of Values.

19.2.2.1.5 Developer's Preliminary Construction Schedule for the first ninety (90) days.

19.2.2.1.6 Schedule of unit prices, if applicable.

19.2.2.1.7 Submittal Schedule.

19.2.2.1.8 Receipt by Architect of all submittals due as of the date of the payment application.

19.2.2.1.9 List of Subcontractors, with names, license numbers, telephone numbers, DIR numbers and Scope of Work.

19.2.2.1.10 All bonds and insurance endorsements; and

19.2.2.1.11 Resumes of Developer's project manager, and if applicable, job site secretary, record documents recorder, and job site superintendent.

19.2.3 Subsequent Payment Requests

The District will not process subsequent payment requests until and unless submittals and Shop Drawings necessary to maintain the Project schedule have been submitted to the Architect.

19.2.4 No Waiver of Criteria

Any payments made to Developer where criteria set forth herein have not been met shall not constitute a waiver of said criteria by District. Instead, such payment shall be construed as a good faith effort by District to resolve differences so Developer may pay its Subcontractors and suppliers. Developer agrees that failure to submit such items may constitute a breach of contract by Developer and may subject Developer to termination.

19.3 District's Approval of Application for Payment

19.3.1 Upon receipt of an Application for Payment, The District shall act in accordance with both of the following:

19.3.1.1 Each Application for Payment shall be reviewed by the District as soon as practicable after receipt for the purpose of determining that the Application for Payment is a proper Application for Payment.

19.3.1.2 Any Application for Payment determined not to be a proper Application for Payment suitable for payment shall be returned to the Developer as soon as practicable, but not later than seven (7) days, after receipt. An Application for Payment returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the Application for Payment is not proper. The number of days available to the District to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the District exceeds this seven-day return requirement.

19.3.2 An Application for Payment shall be considered properly executed if funds are available for payment of the Application for Payment, and payment is not delayed due to an audit inquiry by the financial officer of the District.

19.3.3 The District's review of the Developer's Application for Payment will be based on the District's and the Architect's observations at the Site and the data comprising the Application for Payment that the Work has progressed to the point indicated and that, to the best of the District's and the Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to:

19.3.3.1 Observation of the Work for general conformance with the Contract Documents.

19.3.3.2 Results of subsequent tests and inspections.

19.3.3.3 Minor deviations from the Contract Documents correctable prior to completion; and

19.3.3.4 Specific qualifications expressed by the Architect.

19.3.4 District's approval of the certified Application for Payment shall be based on Developer complying with all requirements for a fully complete and valid certified Application for Payment.

19.3.5 Payments to Developer

19.3.5.1 Within thirty (30) days after approval of the Application for Payment, Developer shall be paid a sum equal to ninety-five percent (95%), of the value of the Tenant Improvement Payment (as verified by Architect and Inspector and certified by Developer) up to the last day of the previous month, less the aggregate of previous payments and amount to be withheld. The value of the Work completed shall be Developer's best estimate. No inaccuracy or error in said estimate shall operate to release the Developer, or any Surety upon any bond, from damages arising from such Work, or from the District's right to enforce each and every provision of the Contract Documents, and the District shall have the right subsequently to correct any error made in any estimate for payment.

19.3.5.2 The Developer may not be entitled to have payment requests processed, or may be entitled to have only partial payment made for Work performed, so long as any direction given by the District concerning the Work, or any portion thereof, remains incomplete.

19.3.6 No Waiver

No payment by District hereunder shall be interpreted so as to imply that District has inspected, approved, or accepted any part of the Work. Notwithstanding any payment, the District may enforce each and every provision of this Contract. The District may correct or require correction of any error subsequent to any payment

19.3.7 Warranty of Title

19.3.7.1 If a lien or a claim based on a stop payment notice of any nature should at any time be filed against the Work or any District property, by any entity that has supplied material or services at the request of the Developer, Developer and Developer's Surety shall promptly, on demand by District and at Developer's and Surety's own expense, take any and all action necessary to cause any such lien or a claim based on a stop payment notice to be released or discharged immediately therefrom.

19.3.7.2 If the Developer fails to furnish to the District within ten (10) calendar days after demand by the District satisfactory evidence that a lien or a claim based on a stop payment notice has been released, discharged, or secured, the District may discharge such indebtedness and deduct the amount required therefor, together with any and all losses, costs, damages, and attorney's fees and expenses incurred or suffered by District from any sum payable to Developer under the Contract.

19.4 Decisions to Withhold Payment

19.4.1 Reasons to Withhold Payment

The District shall withhold payment in whole, or in part, as required by statute. In addition, the District may withhold payment in whole, or in part, to the extent reasonably necessary to protect the District if, in the District's opinion, the representations to the District required herein cannot be made. Payment, in whole, or in part, will be withheld based on the need to protect the District from loss because of, but not limited to, any of the following:

19.4.1.1 Defective Work not remedied within FORTY-EIGHT (48) hours of written notice to Developer.

19.4.1.2 Stop Payment Notices or other liens served upon the District as a result of the Contract.

19.4.1.3 Failure to comply with the requirements of Public Contract Code section 2600 et seq. ("Skilled and Trained Workforce Requirements") or failure to provide to the District a complete, monthly

report demonstrating that Developer and its Subcontractors are complying, unless Developer and its subcontractors have agreed to be bound by a Project Labor Agreement as provided in Public Contract Code section 2600 et seq.

19.4.1.3.1 If Developer provides a complete monthly report, then the District shall immediately resume making payments to the Developer, including all previously withheld payments.

19.4.1.3.2 If the monthly report is incomplete due to the failure of a subcontractor to timely submit the required information to Developer, District may withhold 150% of the value of the monthly billing for a subcontractor that failed to timely submit the required information or did not demonstrate compliance

19.4.1.3.2.1 If Developer substitutes a subcontractor pursuant to Chapter 4 (commencing with Section 4100) for failure to demonstrate compliance, and Developer replaces the subcontractor with one that provides an enforceable commitment that a skilled and trained workforce will be used to complete the Project, the District shall immediately resume making payments to the Developer, including all previously withheld payments.

19.4.1.3.3 If the Developer provides a plan to achieve substantial compliance with the Skilled and Trained Workforce Requirements, the District shall immediately resume making payments to the Developer, including all previously withheld payments unless, within a reasonable time, the District rejects the plan as insufficient and explains the reasons for the rejection.

19.4.1.4 Liquidated damages assessed against the Developer.

19.4.1.5 Reasonable doubt that the Work can be completed for the unpaid balance of the Guaranteed Maximum Price or by the Contract Time.

19.4.1.6 Damage to the District or other contractor(s).

19.4.1.7 Unsatisfactory prosecution of the Work by the Developer.

19.4.1.8 Failure to store and properly secure materials.

19.4.1.9 Failure of the Developer to submit, on a timely basis, proper, sufficient, and acceptable documentation required by the Contract Documents, including, without limitation, a Construction Schedule, Schedule of Submittals, Schedule of Values, Monthly Progress Schedules, Shop Drawings, Product Data and samples, Proposed product lists, executed Change Orders, and/or verified reports.

19.4.1.10 Failure of the Developer to maintain As-Built Drawings.

19.4.1.11 Erroneous estimates by the Developer of the value of the Work performed, or other false statements in an Application for Payment.

19.4.1.12 Unauthorized deviations from the Contract Documents.

19.4.1.13 Failure of the Developer to prosecute the Work in a timely manner in compliance with the Construction Schedule, established progress schedules, and/or completion dates.

19.4.1.14 Failure to provide acceptable electronic certified payroll records, as required by the Labor Code, by these Contract Documents or by written request for each journeyman, apprentice, worker, or other employee employed by the Developer and/or by each Subcontractor in connection with the Work for the period of the Application for Payment or if payroll records are delinquent or inadequate.

19.4.1.15 Failure to properly pay prevailing wages as required in Labor Code section 1720 et seq., failure to comply with any other Labor Code requirements, and/or failure to comply with labor compliance monitoring and enforcement by the DIR.

19.4.1.16 Allowing an unregistered subcontractor, as described in Labor Code section 1725.5, to engage in the performance of any work under this Contract.

19.4.1.17 Failure to comply with any, if applicable federal requirements regarding minimum wages, withholding, payrolls and basic records, apprentice and trainee employment requirements, equal employment opportunity requirements, Copeland Act requirements, Davis-Bacon Act and related requirements, Contract Work Hours and Safety Standards Act requirements.

19.4.1.18 Failure to properly maintain or clean up the Site.

19.4.1.19 Failure to timely indemnify, defend, or hold harmless the District.

19.4.1.20 Failure to perform any implementation and/or monitoring required by the General Permit, including without limitation any SWPPP for the Project and/or the imposition of any penalties or fines therefore whether imposed on the District or Developer.

19.4.1.21 Any payments due to the District, including but not limited to payments for failed tests, utilities changes, or permits.

19.4.1.22 Failure to pay any royalty, license or similar fees.

19.4.1.23 Failure to pay Subcontractor(s) or supplier(s) as required by law and Developer's subcontract agreement and by the Contract Documents; and

19.4.1.24 Developer is otherwise in breach, default, or in substantial violation of any provision of the Contract Documents.

19.4.2 Reallocation of Withheld Amounts

19.4.2.1 After prior written notice to Developer with details regarding the District's proposed application of withheld amounts, District may, in its discretion, apply any withheld amount to pay outstanding claims or obligations as defined herein. In so doing, District shall make such payments on behalf of Developer. If any payment is so made by District, then that amount shall be considered a payment made under the Contract Documents by District to Developer and District shall not be liable to Developer for any payment made in good faith. These payments may be made without prior judicial determination of claim or obligation. District will render Developer an accounting of funds disbursed on behalf of Developer.

19.4.2.2 If Developer defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision thereof, District may, after FORTY-EIGHT (48) hours' written notice to the Developer and opportunity to commence and pursue cure of default, and, without prejudice to any other remedy, make good such deficiencies. The District shall adjust the total Guaranteed Maximum Price by reducing the amount thereof by the cost of making good such deficiencies. If District deems it inexpedient to correct Work that is damaged, defective, or not done in accordance with the provisions of the Contract Documents, an equitable reduction in the Guaranteed Maximum Price (up to one hundred fifty percent (150%) of the estimated reasonable value of the nonconforming Work) shall be made therefor.

19.4.3 Payment After Cure

When Developer removes the grounds for declining approval, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Developer to perform in accordance with the terms and conditions of the Contract Documents.

19.5 Subcontractor Payments

19.5.1 Payments to Subcontractors

No later than seven (7) days after receipt of any Tenant Improvement Payment, or pursuant to Business and Professions Code section 7108.5 and Public Contract Code section 7107, the Developer shall pay to each Subcontractor, out of the amount paid to the Developer on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled. The Developer shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to its Sub-subcontractors in a similar manner.

19.5.2 No Obligation of District for Subcontractor Payment

The District shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

19.5.3 Joint Checks

District shall have the right in its sole discretion, if necessary for the protection of the District, to issue joint checks made payable to the Developer and Subcontractors and/or material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. In no event shall any joint check payment be construed to create any contract between the District and a Subcontractor of any tier, or a material or equipment supplier, or any obligation from the District to such Subcontractor or a material or equipment supplier or rights in such Subcontractor against the District.

20. Completion of the Work

20.1 Completion

20.1.1 District will accept completion of Project and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of District.

20.1.2 The Work may only be accepted as complete by action of the governing board of the District.

20.1.3 District, at its sole option, may accept completion of Project and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of District, except for minor corrective items, as distinguished from incomplete items. If Developer fails to complete all minor corrective items within fifteen (15) days after the date of the District's acceptance of completion, District shall withhold from the final payment one hundred fifty percent (150%) of an estimate of the amount sufficient to complete the corrective items, as reasonably determined by District, until the item(s) are completed.

20.1.4 At the end of the fifteen (15) day period, if there are any items remaining to be corrected, District may elect to proceed as provided herein related to adjustments to Guaranteed Maximum Price, and/or District's right to perform the Work of the Developer.

20.2 Close-Out/Certification Procedures

20.2.1 Punch List

The Developer shall notify the Architect when Developer considers the Work complete. Upon notification, Architect will prepare a list of minor items to be completed or corrected ("Punch List"). The Developer and/or its Subcontractors shall proceed promptly to complete and correct items on the Punch List. Failure to include an item on Punch List does not alter the responsibility of the Developer to complete all Work in accordance with the Contract Documents.

20.2.2 Close-Out/Certification Requirements

20.2.2.1 Utility Connections

Buildings shall be connected to water, gas, sewer, and electric services, complete and ready for use. Service connections shall be made and existing services reconnected.

20.2.2.2 As-Built/Record Drawings and Record Specifications

20.2.2.2.1 Developer shall provide exact "as-built" drawings of the Work upon completion of the Project as indicated in the Contract Documents, including but not limited to the Specifications ("As-Built Drawings") as a condition precedent to approval of final payment.

20.2.2.2.2 Developer is liable and responsible for any and all inaccuracies in the As-Built Drawings, even if inaccuracies become evident at a future date.

20.2.2.2.3 Upon completion of the Work and as a condition precedent to approval of final payment, Developer shall obtain the Inspector's approval of the corrected prints and deliver the same to Architect in a form acceptable to the Architect as part of closeout.

20.2.3 Maintenance Manuals

Developer shall prepare all operation and maintenance manuals and date as indicated in the Specifications.

20.2.4 Source Programming

Developer shall provide all source programming for all items in the Project.

20.2.5 Verified Reports

Developer shall completely and accurately fill out and file forms DSA 6-C or DSA 152 (or most current version applicable at the time the Work is performed), as appropriate. Refer to section 4-336 and section 4-343 of Part 1, Title 24 of the California Code of Regulations.

20.3 Final Inspection

20.3.1 Developer shall comply with Punch List procedures as provided herein, and maintain the presence of its District-approved project superintendent and project manager until the Punch List is complete to ensure proper and timely completion of the Punch List. Under no circumstances shall Developer demobilize its forces prior to completion of the Punch List without District's prior written approval. Upon receipt of Developer's written notice that all of the Punch List items have been fully completed and the Work is ready for final inspection and District acceptance, Architect and Project Inspector will inspect the Work and shall submit to Developer and District a final inspection report

noting the Work, if any, required in order to complete in accordance with the Contract Documents. Absent unusual circumstances, this report shall consist of the Punch List items not yet satisfactorily completed.

20.3.2 Upon Developer's completion of all items on the Punch List and any other uncompleted portions of the Work, the Developer shall notify the District and Architect, who shall again inspect such Work. If the Architect finds the Work complete and acceptable under the Contract Documents, the Architect will notify Developer, who shall then jointly submit to the Architect and the District its final Application for Payment.

20.3.3 Final Inspection Requirements

20.3.3.1 Before calling for final inspection, Developer shall determine that the following have been performed:

20.3.3.1.1 The Work has been completed.

20.3.3.1.2 All life safety items are completed and in working order.

20.3.3.1.3 Mechanical and electrical Work are complete and tested, fixtures are in place, connected, and ready for tryout.

20.3.3.1.4 Electrical circuits scheduled in panels and disconnect switches labeled.

20.3.3.1.5 Painting and special finishes complete.

20.3.3.1.6 Doors complete with hardware, cleaned of protective film, relieved of sticking or binding, and in working order.

20.3.3.1.7 Tops and bottoms of doors sealed.

20.3.3.1.8 Floors waxed and polished as specified.

20.3.3.1.9 Broken glass replaced and glass cleaned.

20.3.3.1.10 Grounds cleared of Developer's equipment, raked clean of debris, and trash removed from Site.

20.3.3.1.11 Work cleaned, free of stains, scratches, and other foreign matter, damaged and broken material replaced.

20.3.3.1.12 Finished and decorative work shall have marks, dirt, and superfluous labels removed.

20.3.3.1.13 Final cleanup, as provided herein.

20.4 Costs of Multiple Inspections

More than two (2) requests of the District to make a final inspection shall be considered an additional service of District, Architect, Construction Manager, and/or Project

Inspector, and all subsequent costs will be invoiced to Developer and if funds are available, withheld from remaining payments.

20.5 Partial Occupancy or Use Prior to Completion

20.5.1 District's Rights to Occupancy

The District may occupy or use any completed or partially completed portion of the Work at any stage, and such occupancy shall not constitute the District's Final Acceptance of any part of the Work. Neither the District's Final Acceptance, the making of Final Payment, any provision in Contract Documents, nor the use or occupancy of the Work, in whole or in part, by District shall constitute acceptance of Work not in accordance with the Contract Documents nor relieve the Developer or the Developer's Performance Bond Surety from liability with respect to any warranties or responsibility for faulty or defective Work or materials, equipment and workmanship incorporated therein. The District and the Developer shall agree in writing to the responsibilities assigned to each of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents. Any dispute as to responsibilities shall be resolved pursuant to the Claims and Disputes provisions herein, with the added provision that during the dispute process, the District shall have the right to occupy or use any portion of the Work that it needs or desires to use.

20.5.2 Inspection Prior to Occupancy or Use

Immediately prior to partial occupancy or use, the District, the Developer, and the Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

20.5.3 No Waiver

Unless otherwise agreed upon, partial or entire occupancy or use of a portion or portions of the Work shall not constitute beneficial occupancy or District's acceptance of the Work not complying with the requirements of the Contract Documents.

21. Final Payment and Retention

21.1 Final Payment

Upon receipt of a final Application for Payment from Developer, the Architect will notify the District whether the Work is complete so that joint inspection of the Work can be scheduled. Thereafter, the District shall jointly inspect the Work and either accept the Work as complete or notify the Architect and the Developer in writing of reasons why the Work is not complete. Upon District's acceptance of the Work of the Developer as fully complete (that, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the District shall record a Notice of Completion with the County Recorder, and the Developer shall, upon receipt of final payment from the District, pay the amount due Subcontractors.

21.2 Prerequisites for Final Payment

The following conditions must be fulfilled prior to Final Payment:

21.2.1 A full release of all Stop Payment Notices served in connection with the Work shall be submitted by Developer.

21.2.2 A duly completed and executed conditional waiver and release upon final payment compliant with Civil Code section 8136 from each subcontractor of any tier and supplier to be paid from the final Tenant Improvement Payment.

21.2.3 A duly completed and executed unconditional waiver and release upon Tenant Improvement Payment compliant with Civil Code section 8134 from each subcontractor of any tier and supplier that was paid from the previous Tenant Improvement Payment(s).

21.2.4 A duly completed and executed "AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS" from the Developer.

21.2.5 The Developer shall have made all corrections to the Work that are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of District required under the Contract Documents.

21.2.6 Each Subcontractor shall have delivered to the Developer all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work.

21.2.7 Developer must have completed all requirements set forth under "Close-Out/Certification Procedures," including, without limitation, submission of an approved set of complete Record Drawings.

21.2.8 Architect shall have issued its written approval that final payment can be made.

21.2.9 The Developer shall have delivered to the District all manuals and materials required by the Contract Documents, which must be approved by the District.

21.2.10 The Developer shall have completed final clean up as provided herein.

21.3 Retention

21.3.1 The retention, less any amounts disputed by the District or that the District has the right to withhold pursuant to provisions herein, shall be paid:

21.3.1.1 After approval by the District of the Architect of the Application and Certificate of Payment.

21.3.1.2 After the satisfaction of the conditions set forth herein.

21.3.1.3 No less than forty-five (45) days after the recording of the Notice of Completion by District; and

21.3.1.4 After receipt of a duly completed and executed unconditional waiver and release upon Final Payment compliant with Civil Code section 8138 from each subcontractor of any tier and supplier that was paid from the Final Payment.

21.3.2 No interest shall be paid on any retention, or on any amounts withheld due to a failure of the Developer to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any Escrow Agreement between the District and the Developer pursuant to Public Contract Code section 22300.

21.4 Substitution of Securities

The District will permit the substitution of securities in accordance with the provisions of Public Contract Code section 22300.

22. Uncovering of Work

If a portion of the Work is covered without Inspector or Architect approval or not in compliance with the Contract Documents, it must, if required in writing by the District, the Project Inspector, or the Architect, be uncovered for the Project Inspector's or the Architect's observation and be corrected, replaced and/or recovered at the Developer's expense without change in the Guaranteed Maximum Price or Contract Time.

23. Nonconforming Work and Correction of Work

23.1 Nonconforming Work

23.1.1 Developer shall promptly remove from Premises all Work identified by District as failing to conform to the Contract Documents whether incorporated or not. Developer shall promptly replace and re-execute its own Work to comply with the Contract Documents without additional expense to the District and shall bear the expense of making good all work of other contractors destroyed or damaged by any removal or replacement pursuant hereto and/or any delays to the District or other contractors caused thereby.

23.1.2 If Developer does not commence to remove Work that District has identified as failing to conform to the Contract Documents within a reasonable time, not to exceed FORTY-EIGHT (48) hours after written notice and complete removal of work within a reasonable time, District may remove it and may store any material at Developer's expense. If Developer does not pay expense(s) of that removal within ten (10) days' time thereafter, District may, upon ten (10) days' written notice, sell any material at auction or at private sale and shall deduct all costs and expenses incurred by the District and/or District may withhold those amounts from payment(s) to Developer.

23.2 Correction of Work

23.2.1 Correction of Rejected Work

Pursuant to the notice provisions herein, the Developer shall promptly correct the Work rejected by the District, the Architect, or the Project Inspector as failing to conform to the requirements of the Contract Documents, whether observed before or after Completion and whether or not fabricated, installed, or completed. The Developer shall bear costs of correcting the rejected Work, including additional testing, inspections, and compensation for the Inspector's or the Architect's services and expenses made necessary thereby.

23.2.2 Two-Year Warranty Corrections

If, within two (2) years after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties established hereunder, or by the terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Developer shall correct it promptly after receipt of written notice from the District to do so. This period of two (2) years shall be extended with respect to portions of the Work first performed after Completion by the period of time between Completion and the actual performance of the Work. This obligation hereunder shall survive District's acceptance of the Work under the Contract Documents and termination of the Contract Documents. The District shall give such notice promptly after discovery of the condition.

23.3 District's Right to Perform Work

23.3.1 If the Developer should neglect to prosecute the Work properly or fail to perform any provisions of the Contract Documents, the District, after providing FORTY-EIGHT (48) hours written notice and an opportunity to cure the failure, to the Developer, may, without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Developer.

23.3.2 If it is found at any time, before or after completion of the Work, that Developer has varied from the Drawings and/or Specifications, including, but not limited to, variation in material, quality, form, or finish, or in the amount or value of the materials and labor used, District may require at its option:

23.3.2.1 That all such improper Work be removed, remade or replaced, and all work disturbed by these changes be made good by Developer at no additional cost to the District.

23.3.2.2 That the District deduct from any amount due Developer the sum of money equivalent to the difference in value between the work performed and that called for by the Drawings and Specifications; or

23.3.2.3 That the District exercise any other remedy it may have at law or under the Contract Documents, including but not limited to the District hiring its own forces or another contractor to replace the Developer's nonconforming Work, in which case the District shall either

issue a deductive Change Order, a Construction Change Directive, or invoice the Developer for the cost of that work. Developer shall pay any invoices within thirty (30) days of receipt of same or District may withhold those amounts from payment(s) to Developer.

24. Termination And Suspension

The Parties' rights to terminate the Project are as indicated in the Facilities Lease. In the event of a termination of the Facilities Lease and notwithstanding any other provision in the Contract Documents, the Surety shall remain liable to all obligees under the Payment Bond and to the District under the Performance Bond for any claim related to the Project.

25. Claims Process

25.1 Performance during Claim Process

Developer and its subcontractors shall continue to perform its Work under the Contract and shall not cause a delay of the Work during any dispute, claim, negotiation, mediation, or arbitration proceeding, except by written agreement by the District.

25.2 Definition of Claim

25.2.1 Pursuant to Public Contract Code section 9204, the term "Claim" means a separate demand by the Developer sent by registered mail or certified mail with return receipt requested, for one or more of the following:

25.2.1.1 A time extension, including without limitation, for relief of damages or penalties for delay assessed by the District under the Contract;

25.2.1.2 Payment by the District of money or damages arising from work done by, or on behalf of, the Developer pursuant to the Contract and payment of which is not otherwise expressly provided for or to which Developer is not otherwise entitled to; or

25.2.1.3 An amount of payment disputed by the District.

25.3 Claims Presentation

25.3.1 If Developer intends to apply for an increase in the Guaranteed Maximum Price or Contract Time for any reason including, without limitation, the acts of District or its agents, Developer shall, within thirty (30) days after the event giving rise to the Claim, give notice of the Claim in writing, including an itemized statement of the details and amounts of its Claim for any increase in the Guaranteed Maximum Price or time requested, including a Schedule Analysis and any and all other documentation substantiating Developer's claimed damages. Otherwise, Developer shall have waived and relinquished its dispute against the District and Developer's claims for compensation or an extension of time shall be forfeited and invalidated.

25.3.2 The Claim shall identify:

25.3.2.1 The issues, events, conditions, circumstances and/or causes giving rise to the dispute;

25.3.2.2 The pertinent dates and/or durations and actual and/or anticipated effects on the Guaranteed Maximum Price, Contract Schedule milestones and/or Contract Time adjustments; and

25.3.2.3 The line-item costs for labor, material, and/or equipment, if applicable; or

25.3.2.4 A request by Developer, if any, to waive the claims procedure under Public Contract Code section 9204 and proceed directly to the commencement of a civil action or binding arbitration.

25.3.3 The Claim shall include the following certification by the Developer:

25.3.3.1 The undersigned Developer certifies under penalty of perjury that the attached dispute is made in good faith; that the supporting data is accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the adjustment for which Developer believes the District is liable; and that I am duly authorized to certify the claim on behalf of the Developer.

25.3.3.2 Furthermore, Developer understands that the value of the attached dispute expressly includes any and all of the Developer's costs and expenses, direct and indirect, resulting from the Work performed on the Project, additional time required on the Project and/or resulting from delay to the Project. Any costs, expenses, damages, or time extensions not included are deemed waived.

25.4 Claim Resolution pursuant to Public Contract Code section 9204

25.4.1 STEP 1:

25.4.1.1 Upon receipt of a Claim by registered or certified mail, return receipt requested, including the documents necessary to substantiate it, the District shall conduct a reasonable review of the Claim and, within a period not to exceed 45 days, shall provide the Developer a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of a Claim, the District and Developer may, by mutual agreement, extend the time period to provide a written statement. If the District needs approval from its governing body to provide the Developer a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of Claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three (3) days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide Developer a written statement identifying the disputed portion and the undisputed portion.

25.4.1.1.1 Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. Amounts not paid in a timely manner as required by this section, section 25.4, shall bear interest at seven percent (7%) per annum.

25.4.1.2 Upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable. In this instance, District and Developer must comply with the sections below regarding Public Contract Code section 20104 et seq. and Government Code Claim Act Claims.

25.4.1.3 If the District fails to issue a written statement, or to otherwise meet the time requirements of this section, this shall result in the Claim being deemed rejected in its entirety. A claim that is denied by reason of the District's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of Developer.

25.4.2 STEP 2:

25.4.2.1 If Developer disputes the District's written response, or if the District fails to respond to a Claim within the time prescribed, Developer may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the dispute. Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the District shall provide the Developer a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed.

25.4.2.2 Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the District issues its written statement. Amounts not paid in a timely manner as required by this section, section 25.4, shall bear interest at seven percent (7%) per annum.

25.4.3 STEP 3:

25.4.3.1 Any disputed portion of the claim, as identified by Developer in writing, shall be submitted to nonbinding mediation, with the District and Developer sharing the associated costs equally. The District and Developer shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is

unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

25.4.3.1.1 For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

25.4.3.2 Unless otherwise agreed to by the District and Developer in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Public Contract Code section 20104.4 to mediate after litigation has been commenced.

25.4.4 STEP 4:

25.4.4.1 If mediation under this section does not resolve the parties' dispute, the District may, but does not require arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program.

25.5 Subcontractor Pass-Through Claims

25.5.1 If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a District because privity of contract does not exist, the contractor may present to the District a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that Developer present a Claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be presented to the District shall furnish reasonable documentation to support the Claim.

25.5.2 Within 45 days of receipt of this written request from a subcontractor, Developer shall notify the subcontractor in writing as to whether the Developer presented the Claim to the District and, if Developer did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so.

25.5.3 Developer shall bind all its Subcontractors to the provisions of this section and will hold the District harmless against Claims by Subcontractors.

25.6 Government Code Claim Act Claim

25.6.1 If a Claim, or any portion thereof, remains in dispute upon satisfaction of all applicable Claim Resolution requirements, including those pursuant to Public Contract Code section 9204, the Developer shall comply with all claims presentation requirements as provided in Chapter 1 (commencing with section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of Government Code as a condition precedent to the Developer's right to bring a civil action against the District. For purposes of those provisions, the running of the time within which a claim must be presented to the District shall

be tolled from the time the Developer submits its written claim until the time the claim is denied, including any time utilized by any applicable meet and confer process.

25.7 Claim Resolution pursuant to Public Contract Code section 20104 et seq.

25.7.1 In the event of a disagreement between the parties as to performance of the Work, the interpretation of this Contract, or payment or nonpayment for Work performed or not performed, the parties shall attempt to resolve all claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between Developer and District by those procedures set forth in Public Contract Code section 20104 et seq., to the extent applicable.

25.7.1.1 Developer shall file with the District any written Claim, including the documents necessary to substantiate it, upon the application for final payment.

25.7.1.2 For claims of less than fifty thousand dollars (\$50,000), the District shall respond in writing within forty-five (45) days of receipt of the Claim or may request in writing within thirty (30) days of receipt of the Claim any additional documentation supporting the claim or relating to defenses or claims the District may have against the Developer.

25.7.1.2.1 If additional information is required, it shall be requested and provided by mutual agreement of the parties.

25.7.1.2.2 District's written response to the documented Claim shall be submitted to the Developer within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the Developer to produce the additional information, whichever is greater.

25.7.1.3 For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the District shall respond in writing to all written Claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or claims the District may have against the Developer.

25.7.1.3.1 If additional information is required, it shall be requested and provided upon mutual agreement of the District and the Developer.

25.7.1.3.2 The District's written response to the claim, as further documented, shall be submitted to the Developer within thirty (30) days after receipt of the further documentation, or within a period of time no greater than that taken by the Developer to produce the additional information or requested documentation, whichever is greater.

25.7.1.4 If Developer disputes the District's written response, or the District fails to respond within the time prescribed, Developer may so

notify the District, in writing, either within fifteen (15) days of receipt of the District's response or within fifteen (15) days of the District's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the District shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

25.7.1.5 Following the meet and confer conference, if the claim or any portion of it remains in dispute, the Developer shall file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions the running of the time within which a claim must be filed shall be tolled from the time the Developer submits its written Claim until the time the Claim is denied, including any period of time utilized by the meet and confer process.

25.7.1.6 For any civil action filed to resolve claims filed pursuant to this section, within sixty (60) days, but no earlier than thirty (30) days, following the filing of responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediator, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

25.7.1.7 If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of the Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act, (commencing with Section 2016) of Chapter 1 of Title 4 of part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

25.7.1.8 The District shall not fail to pay money as to any portion of a Claim which is undisputed except as otherwise provided in the Contract Documents. In any suit filed pursuant to this section, the District shall pay interest at the legal rate on any arbitration award or judgment. Interest shall begin to accrue on the date the suit is filed in a court of law.

25.7.2 Developer shall bind its Subcontractors to the provisions of this Section and will hold the District harmless against disputes by Subcontractors.

25.8 Claim Resolution Non-Applicability

25.8.1 The procedures for dispute and claim resolution set forth in this Article shall not apply to the following:

25.8.1.1 Personal injury, wrongful death or property damage claims.

25.8.1.2 Latent defect or breach of warranty or guarantee to repair.

25.8.1.3 Stop payment notices.

25.8.1.4 District's rights set forth in the Article on Suspension and Termination.

25.8.1.5 Disputes arising out of labor compliance enforcement by the Department of Industrial Relations; or

25.8.1.6 District rights and obligations as a public entity set forth in applicable statutes; provided, however, that penalties imposed against a public entity by statutes, including, but not limited to, Public Contract Code sections 20104.50 and 7107, shall be subject to the Claim Resolution requirements provided in this Article.

25.9 Attorney's Fees

25.9.1 Should litigation be necessary to enforce any terms or provisions of this Agreement, then each party shall bear its own litigation and collection expenses, witness fees, court costs and attorney's fees.

26. State Labor, Wage & Hour, Apprentice, And Related Provisions

26.1 Labor Compliance and Enforcement

Since this Project is subject to labor compliance and enforcement by the Department of Industrial Relations ("DIR"), Developer specifically acknowledges and understands that it shall perform the Work of this Agreement while complying with all the applicable provisions of Division 2, Part 7, Chapter 1, of the Labor Code and Title 8 of the California Code of Regulations, including, without limitation, the requirement that the Developer and all Subcontractors shall timely furnish complete and accurate electronic certified payroll records directly to the DIR. The District may not issue payment if this requirement is not met.

26.2 Wage Rates, Travel, and Subsistence

26.2.1 Pursuant to the provisions of Article 2 (commencing at section 1770), Chapter 1, Part 7, Division 2, of the Labor Code of California, the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public work is to be performed for each craft, classification, or type of worker needed to execute the Contract Documents are on file at the District's principal office and copies will be made available to any interested party on request. Developer shall obtain and post a copy of these wage rates at the job site.

26.2.2 Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half times the above specified rate of per diem wages, unless otherwise specified. The holidays upon which those rates shall be paid need not be specified by the District, but shall be all holidays recognized in the applicable collective bargaining agreement. If the prevailing rate is not

based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code.

26.2.3 Developer shall pay and shall cause to be paid each worker engaged in Work on the Project not less than the general prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations ("DIR") ("Director"), regardless of any contractual relationship which may be alleged to exist between Developer or any Subcontractor and such workers.

26.2.4 If, prior to execution of the Facilities Lease, the Director determines that there has been a change in any prevailing rate of per diem wages in the locality in which the Work under the Contract Documents is to be performed, such change shall not alter the wage rates in the Contract Documents subsequently awarded.

26.2.5 Pursuant to Labor Code section 1775, Developer shall, as a penalty, forfeit the statutory amount (believed by the District to be currently two hundred dollars (\$200) to District for each calendar day, or portion thereof, for each worker paid less than the prevailing rates, determined by the District and/or the Director, for the work or craft in which that worker is employed for any public work done under Contract by Developer or by any Subcontractor under it. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate, shall be paid to each worker by Developer.

26.2.6 Any worker employed to perform Work on the Project, which Work is not covered by any classification listed in the general prevailing wage rate of per diem wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to Work to be performed by him, and that minimum wage rate shall be retroactive to time of initial employment of the person in that classification.

26.2.7 Pursuant to Labor Code section 1773.1, per diem wages are deemed to include employer payments for health and welfare, pension, vacation, travel time, subsistence pay, and apprenticeship or other training programs authorized by Labor Code section 3093, and similar purposes.

26.2.8 Developer shall post at appropriate conspicuous points on the Project Site a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned. In addition, Developer shall post a sign-in log for all workers and visitors to the Site, a list of all Subcontractors of any tier on the Site, and the required Equal Employment Opportunity poster(s).

26.3 Hours of Work

26.3.1 As provided in Article 3 (commencing at section 1810), Chapter 1, Part 7, Division 2, of the Labor Code, eight (8) hours of labor shall constitute a legal day of work. The time of service of any worker employed at any time by Developer or by any Subcontractor on any subcontract under the Contract Documents upon the Work or upon any part of the Work contemplated by the

Contract Documents shall be limited and restricted by Developer to eight (8) hours per day, and forty (40) hours during any one week, except as hereinafter provided. Notwithstanding the provisions hereinabove set forth, Work performed by employees of Developer in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon this public work upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half times the basic rate of pay.

26.3.2 Developer shall keep and shall cause each Subcontractor to keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by Developer in connection with the Work or any part of the Work contemplated by the Contract Documents. The record shall be kept open at all reasonable hours to the inspection of District and to the Division of Labor Standards Enforcement of the DIR.

26.3.3 Pursuant to Labor Code section 1813, Developer shall, as a penalty, forfeit the statutory amount (believed by the District to be currently twenty-five dollars (\$25)) to the District for each worker employed in the execution of the Contract Documents by Developer or by any Subcontractor for each calendar day during which a worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of Article 3 (commencing at section 1810), Chapter 1, Part 7, Division 2, of the Labor Code.

26.3.4 Any Work necessary to be performed after regular working hours, or on Sundays or other holidays shall be performed without additional expense to the District.

26.4 Payroll Records

26.4.1 Developer shall upload, and shall cause each Subcontractor performing any portion of the Work under this Contract to upload, an accurate and complete certified payroll record ("CPR") electronically using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iform (or current form) online on a weekly basis and within ten (10) days of any request by the District or Labor Commissioner at <http://www.dir.ca.gov/Public-Works/Certified/Payroll-Reporting.html> or current application and URL, showing the name, address, social security number, work classification, straight time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Developer and/or each Subcontractor in connection with the Work.

26.4.2 The CPRs enumerated hereunder shall be filed directly with the DIR on a weekly basis or to the requesting party, whether the District or DIR, within ten (10) days after receipt of each written request. The CPRs from the Developer and each Subcontractor for each week shall be provided on or before ten (10) days after the end of the Sunday to Saturday conventional week covered by the CPRs. District may not make any payment to Developer until:

26.4.2.1 The Developer and/or its Subcontractor(s) provide CPRs acceptable to the District and DIR.

26.4.2.2 Any delay in Developer and/or its Subcontractor(s) providing CPRs to the District or DIR in a timely manner may directly delay the District's review and/or audit of the CPRs and Developer's payment.

26.4.3 All CPRs shall be available for inspection at all reasonable hours at the principal office of Developer on the following basis:

26.4.3.1 A certified copy of an employee's CPR shall be made available for inspection or furnished to the employee or his/her authorized representative on request.

26.4.3.2 CPRs shall be made available for inspection or furnished upon request or as required by regulation to a representative of the District, Division of Labor Standards Enforcement, Division of Apprenticeship Standards, and/or the DIR.

26.4.3.3 CPRs shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through the District, Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested CPRs have not been provided pursuant to the provisions herein, the requesting party shall, prior to being provided the records, reimburse the costs of preparation by Developer, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of Developer.

26.4.4 Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by District, Division of Apprenticeship Standards, Division of Labor Standards Enforcement, or DIR shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of Developer awarded the Project under the Contract Documents or performing under the Contract Documents shall not be marked or obliterated.

26.4.5 Developer shall inform District of the location of the records enumerated hereunder, including the street address, city, and county, and shall, within five (5) working days of a change in location of the records, provide a notice of change of location and address.

26.4.6 In the event of noncompliance with the requirements of this section, Developer shall have ten (10) days in which to comply subsequent to receipt of written notice specifying in what respects Developer must comply with this section. Should noncompliance still be evident after the ten (10) day period, Developer shall, as a penalty, forfeit up to one hundred dollars (\$100) to District for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Labor Commissioner, these penalties shall be withheld from Tenant Improvement Payments then due.

26.5 [Reserved]

26.6 Apprentices

26.6.1 Developer acknowledges and agrees that, if the Contract Documents involve a dollar amount greater than or a number of working days greater than that specified in Labor Code section 1777.5, then this Contract is governed by the provisions of Labor Code Section 1777.5 and 29 CFR part 5. It shall be the responsibility of Developer to ensure compliance with this Article and with Labor Code section 1777.5 for all apprenticeship occupations.

26.6.2 Apprentices of any crafts or trades may be employed and, when required by Labor Code section 1777.5, shall be employed provided they are properly registered in full compliance with the provisions of the Labor Code.

26.6.3 Every apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he/she is employed, and shall be employed only at the work of the craft or trade to which she/he is registered.

26.6.4 Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at section 3070), Division 3, of the Labor Code, are eligible to be employed. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he/she is training.

26.6.5 Pursuant to Labor Code section 1777.5, if that section applies to this Contract as indicated above, Developer and any Subcontractors employing workers in any apprenticeable craft or trade in performing any Work under this Contract shall apply to the applicable joint apprenticeship committee for a certificate approving the Developer or Subcontractor under the applicable apprenticeship standards and fixing the ratio of apprentices to journeymen employed in performing the Work.

26.6.6 Pursuant to Labor Code section 1777.5, if that section applies to this Contract as indicated above, Developer and any Subcontractor may be required to make contributions to the apprenticeship program.

26.6.7 If Developer or Subcontractor willfully fails to comply with Labor Code section 1777.5, then, upon a determination of noncompliance by the Administrator of Apprenticeship, it shall:

26.6.7.1 Be denied the right to bid on any subsequent project for one (1) year from the date of such determination.

26.6.7.2 Forfeit, as a penalty, to District the full amount stated in Labor Code section 1777.7. Interpretation and enforcement of these provisions shall be in accordance with the rules and procedures of the California Apprenticeship Council and under the authority of the Chief of the Division of Apprenticeship Standards.

26.6.7.3 Developer and all Subcontractors shall comply with Labor Code section 1777.6, which section forbids certain discriminatory practices in the employment of apprentices.

26.6.7.4 Developer shall become fully acquainted with the law regarding apprentices prior to commencement of the Work. Special attention is directed to sections 1777.5, 1777.6, and 1777.7 of the Labor Code, and Title 8, California Code of Regulations, Section 200 et seq. Questions may be directed to the State Division of Apprenticeship Standards, 455 Golden Gate Avenue, 9th Floor, San Francisco, California 94102.

26.7 Skilled and Trained Workforce

26.7.1 Developer and its subcontractors at every tier hereby provides an enforceable commitment to comply with Public Contract Code section 2600 et seq., which requires use of a skilled and trained workforce to perform all work on the Contract or Project that falls within an apprenticeable occupation in the building and construction trades.

26.7.1.1 "Apprenticeable Occupation" means an occupation for which the Chief of the Division of Apprenticeship Standards of the Department of Industrial Relations ("Chief") had approved an apprenticeship program pursuant to Section 3075 of the Labor Code before January 1, 2014.

26.7.1.2 "Skilled and Trained Workforce" means a workforce that meets all of the following conditions:

26.7.1.2.1 All of the workers are either skilled journeypersons or apprentices registered in an apprenticeship program approved by the Chief.

26.7.1.2.2 That, for the applicable dates, either (A) the number of the skilled journeypersons employed to perform work on the Contract or Project by the Developer or its subcontractors at every tier are graduates of an apprenticeship program for the applicable occupation that was either approved by the Chief pursuant to Labor Code section 3075 or located outside California and approved for federal purposes pursuant to the apprenticeship regulations adopted by the federal Secretary of Labor, or (B) the hours of work performed by skilled journeypersons who have graduated from an approved apprenticeship program meet at least the percentages set forth in the following chart:

APPLICABLE DATES	% REQUIREMENT	EXCLUDED OCCUPATIONS
1/1/17 – 12/31/18	At least 30%	Teamster – no percentage requirement.
1/1/19 – 12/31/19	At least 40%	Teamster – no percentage requirement.
1/1/20 – 12/31/20	At least 50%	Acoustical installer, bricklayer, carpenter, cement mason, drywall installer or lather, marble mason, finisher, or setter, modular furniture or systems installer, operating engineer, pile driver, plasterer, roofer or waterproofer, stone mason, surveyor, terrazzo worker or finisher, and tile layer, setter, or finisher – at least 30% for each.
1/1/21 – 12/31/21	At least 60%	

26.7.1.2.3 For an apprenticeable occupation in which no apprenticeship program has been approved by the Chief before January 1, 1995, up to one-half of the above graduation percentage requirements set forth in the above chart may be satisfied by skilled journeypersons who commenced working in the apprenticeable occupation before the Chief's approval of an apprenticeship program for that occupation in the county in which the Project is located.

26.7.1.2.4 The contractor or subcontractor need not meet the apprenticeship graduation requirements if:

26.7.1.2.4.1 During a calendar month, the Developer or subcontractor employs skilled journeypersons to perform fewer than 10 hours of work on the Contract or Project; or

26.7.1.2.4.2 The subcontractor was not a listed subcontractor under Public Contract Code section 4104 or a substitute for a listed subcontractor, and the subcontract does not exceed one-half of one percent (0.5%) of the price of the prime contract.

26.7.1.3 "Skilled Journeyperson" means a worker who either:

26.7.1.3.1 Graduated from an apprenticeship program for the applicable occupation that was approved by the Chief or located outside of California and approved for federal purposes pursuant to the apprenticeship regulations adopted by the federal Secretary of Labor; or

26.7.1.3.2 Has at least as many hours of on-the-job experience in the applicable occupation as would be required to graduate from an apprenticeship program for the applicable occupation that is approved by the Chief.

26.7.2 Developer and its subcontractors will demonstrate its compliance with the Skilled and Trained Workforce requirements by either of the following:

26.7.2.1 Provide monthly reports to the District demonstrating that the Developer and its subcontractors are complying with the requirements of Public Contract Code section 2600 et seq., which shall be a public record under California Public Records Act, Government Code section 6250 et seq.; or

26.7.2.2 Provide evidence that Developer and its subcontractors have agreed to be bound by: (1) a project labor agreement entered into by the District that binds all contractors and all its subcontractors at every tier performing work on the Project to use a skilled and trained workforce; (2) the extension or renewal of a project labor agreement entered into by the District prior to January 1, 2017; or (3) a project labor agreement that binds all contractors and all its subcontractors at

every tier performing work on the Project to use a skilled and trained workforce.

26.8 Non-Discrimination

26.8.1 Developer herein agrees to comply with the provisions of the California Fair Employment and Housing Act as set forth in part 2.8 of division 3 of the California Government Code, commencing at section 12900; the Federal Civil Rights Act of 1964, as set forth in Public Law 88-352, and all amendments thereto; Executive Order 11246; and all administrative rules and regulations found to be applicable to Developer and Subcontractor.

26.8.2 Special requirements for Federally Assisted Construction Contracts: During the performance of the requirement of the Contract Documents, Developer agrees to incorporate in all subcontracts the provisions set forth in Chapter 60-1.4(b) of Title 41 published in Volume 33 No. 104 of the Federal Register dated May 28, 1968.

26.9 Labor First Aid

Developer shall maintain emergency first aid treatment for Developer's laborers and mechanics on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 et seq.) and the California Occupational Safety and Health Act of 1973 (Lab. Code, § 6300 et seq.; 8 Cal. Code of Regs., § 330 et seq.).

27. [Reserved]

28. Miscellaneous

28.1 Assignment of Antitrust Actions

Although this project may not have been formally bid, the following provisions may apply:

28.1.1 Section 7103.5(b) of the Public Contract Code states:

In entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, the contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor, without further acknowledgment by the parties.

28.1.2 Section 4552 of the Government Code states in pertinent part:

In submitting a bid to a public purchasing body, the bidder offers and agrees that if the bid is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the

Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

28.1.3 Section 4553 of the Government Code states in pertinent part:

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under this chapter, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

28.1.4 Section 4554 of the Government Code states in pertinent part:

Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under this part if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

28.1.5 Under this Article, "public purchasing body" is District and "bidder" is Developer.

28.2 Excise Taxes

If, under Federal Excise Tax Law, any transaction hereunder constitutes a sale on which a Federal Excise Tax is imposed and the sale is exempt from such Federal Excise Tax because it is a sale to a State or Local Government for its exclusive use, District, upon request, will execute documents necessary to show (1) that District is a political subdivision of the State for the purposes of such exemption, and (2) that the sale is for the exclusive use of District. No Federal Excise Tax for such materials shall be included in any Guaranteed Maximum Price.

28.3 Taxes

Guaranteed Maximum Price is to include any and all applicable sales taxes or other taxes that may be due in accordance with section 7051 et seq. of the Revenue and Taxation Code, Regulation 1521 of the State Board of Equalization or any other tax code that may be applicable.

28.4 Shipments

All shipments must be F.O.B. destination to Site or approved sites, as indicated in the Contract Documents. There must be no charge for containers, packing, unpacking, drayage, or insurance. The total Guaranteed Maximum Price shall be all inclusive (including sales tax) and no additional costs of any type will be considered.

28.5 Compliance with Government Reporting Requirements

If this Contract is subject to federal or other governmental reporting requirements because of federal or other governmental financing in whole or in part for the Project of which it is part, or for any other reason, Developer shall comply with those reporting requirements at the request of the District at no additional cost.

[END OF DOCUMENT]

EXHIBIT D-1

SPECIAL CONDITIONS

1. Permits, Certificates, Licenses, Fees, Approvals

1.1. Payment for Permits, Certificates, Licenses, Fees, Approvals.

As required in the General Construction Provisions, the Developer shall secure and pay for all permits, licenses and certificates necessary for the prosecution of the Work with the exception of the following:

1.1.1 DSA Plan Check Fees

1.1.2 Project Inspector

1.1.3 Special Materials Testing and Inspection

1.1.4 City of Tracy Off Site Improvement Agreement (OIA) Fees

1.1.5 City of Tracy Encroachment Permit Fees

With respect to the above listed items, Developer shall be responsible for securing such items; however, District will be responsible for payment of these charges or fees, but only for the actual and direct costs (without markup or additional fees). Developer shall notify the District of the amount due with respect to these items and to whom the amount is payable. Developer shall provide the District with an invoice and receipt with respect to such charges or fees. In the alternative, District may pay such costs directly to DSA.

2. Disabled Veterans Business Enterprise

This Project uses or may plan to use funds allocated pursuant to the State of California School Facility Program for the construction and/or modernization of school buildings. Therefore, Section 17076.11 of the Education Code requires the District to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%), per year, of the overall dollar amount expended each year by the District on projects that receive state funding and the Developer must submit the Disabled Veteran Business Enterprise Participation Certification to the District with its executed Agreement, identifying the steps Developer took to solicit DVBE participation in conjunction with this Contract.

3. Modernization Projects

3.1 Access.

Access to the school buildings and entry to buildings, classrooms, restrooms, mechanical rooms, electrical rooms, or other rooms, for construction purposes, must be coordinated with District and onsite District personnel before Work is to start. Unless agreed to otherwise in writing, only a school custodian will be allowed to unlock and lock doors in existing building(s). The custodian will be available only while school is in session. If a custodian is required to arrive before 7:00 a.m. or leave after 3:30 p.m. to accommodate Developer's Work, the overtime wages for the custodian will be paid by the Developer, unless at the discretion of the District, other arrangements are made in advance.

3.2 Master Key.

Upon request, the District may, at its own discretion, provide a master key to the school site for the convenience of the Developer. The Developer agrees to pay all expenses to re-key the entire school site and all other affected District buildings if the master key is lost or stolen, or if any unauthorized party obtains a copy of the key or access to the school.

3.3 Maintaining Services.

The Developer is advised that Work is to be performed in spaces regularly scheduled for instruction. Interruption and/or periods of shutdown of public access, electrical service, water service, lighting, or other utilities shall be only as arranged in advance with the District. Developer shall provide temporary services to all facilities interrupted by Developer's Work.

3.4 Maintaining Utilities.

The Developer shall maintain in operation during duration of Contract, drainage lines, storm drains, sewers, water, gas, electrical, steam, and other utility service lines within working area.

3.5 Confidentiality.

Developer shall maintain the confidentiality of all information, documents, programs, procedures and all other items that Developer encounters while performing the Work. This requirement shall be ongoing and shall survive the expiration or termination of this Contract and specifically includes, without limitation, all student, parent, and employee disciplinary information and health information.

3.6 Work during Instructional Time.

Developer affirms that Work may be performed during ongoing instruction in existing facilities. If so, Developer agrees to cooperate to the best of its ability to minimize any disruption to school operations and any use of school facilities by the public up to, and including, rescheduling specific work activities, at no additional cost to District.

3.7 No Work during Student Testing.

Developer shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-required tests.

4. Substitution for Specified Items

4.1. Whenever in the Specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name, or by name of manufacturer, that Specification shall be deemed to be followed by the words "or equal." Developer may, unless otherwise stated, offer any material, process, or article that shall be substantially equal or better in every respect to that so indicated or specified.

4.1.1. If the material, process, or article offered by Developer is not, in the opinion of the District, substantially equal or better in every respect to that

specified, then Developer shall furnish the material, process, or article specified in the Specifications without any additional compensation or change order.

4.1.2. This provision shall not be applicable with respect to any material, product, thing or service for which District made findings and gave notice in accordance with Public Contract Code section 3400(c); therefore, Developer shall not be entitled to request a substitution with respect to those materials, products or services.

4.2. A request for a substitution shall be submitted as follows:

4.2.1. Developer shall notify the District in writing of any request for a substitution at least ten (10) days prior to proposal opening as indicated in the Request for Qualifications and Proposals.

4.2.2. Requests for Substitutions after award of the Contract shall be submitted within thirty-five (35) days of the date of the Notice to Proceed with Construction.

4.3. Within 35 days after the date of the Notice to Proceed with Construction, Developer shall provide data substantiating a request for substitution of "an equal" item, including but not limited to the following:

4.3.1. All variations of the proposed substitute from the material specified including, but not limited to, principles of operation, materials, or construction finish, thickness or gauge of materials, dimensions, weight, and tolerances;

4.3.2. Available maintenance, repair or replacement services;

4.3.3. Increases or decreases in operating, maintenance, repair, replacement, and spare parts costs;

4.3.4. Whether or not acceptance of the substitute will require other changes in the Work (or in work performed by the District or others under Contract with the District); and

4.3.5. The time impact on any part of the Work resulting directly or indirectly from acceptance of the proposed substitute.

4.4. No substitutions shall be made until approved, in writing, by the District. The burden of proof as to equality of any material, process, or article shall rest with Developer. The Developer warrants that if substitutes are approved:

4.4.1. The proposed substitute is equal or superior in all respects to that specified, and that such proposed substitute is suitable and fit for the intended purpose and will perform adequately the function and achieve the results called for by the general design and the Contract Documents;

4.4.2. The Developer provides the same warranties and guarantees for the substitute that would be provided for that specified;

4.4.3. The Developer shall be fully responsible for the installation of the substitute and any changes in the Work required, either directly or indirectly, because of the acceptance of such substitute, with no increase in Contract Price or Contract Time. Incidental changes or extra component parts required to

accommodate the substitute will be made by the Developer without a change in the Contract Price or Contract Time;

4.4.4. The Developer shall be responsible for any re-design costs occasioned by District's acceptance and/or approval of any substitute; and

4.4.5. The Developer shall, in the event that a substitute is less costly than that specified, credit the District with one hundred percent (100%) of the net difference between the substitute and the originally specified material. In this event, the Developer agrees to execute a deductive Change Order to reflect that credit.

4.5. In the event Developer furnishes a material, process, or article more expensive than that specified, the difference in the cost of that material, process, or article so furnished shall be borne by Developer.

4.6. In no event shall the District be liable for any increase in Contract Price or Contract Time due to any claimed delay in the evaluation of any proposed substitute or in the acceptance or rejection of any proposed substitute.

4.7. Developer shall be responsible for any costs the District incurs for professional services, DSA fees, or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Developer and/or to accommodate Developer's means and methods. District may deduct those costs from any amounts owing to the Developer for the review of the request for substitution, even if the request for substitution is not approved. District, at its sole discretion, shall deduct from the payments due to and/or invoice Developer for all the professional services and/or DSA fees or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Developer and/or to accommodate Developer's means and methods.

APPENDIX A

DISTRICT MMRP

[REMAINDER OF PAGE INTENTIONALLY BLANK; EXHIBIT FOLLOWS]

CONTRACT DOCUMENTS

For all or a portion of the following Site:

West High School Addition Project #2024/25-007
1775 West Lowell Avenue
Tracy, CA 95376
APN: 232-13-010

By and between

Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376

And

[Developer]
[Address]

Dated as of _____, 2024

PAYMENT BOND
Developer's Labor & Material Bond
(100% of Contract Price)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Tracy Unified School District, ("District") and _____ ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

WEST HIGH SCHOOL AG ADDITION

("Project" or "Contract") which Contract dated _____, 2024, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, pursuant to law and the Contract, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by which the Contract is awarded in an amount equal to one hundred percent (100%) of the Contract price, to secure the claims to which reference is made in sections 9000 through 9510 and 9550 through 9566 of the Civil Code, and division 2, part 7, of the Labor Code.

NOW, THEREFORE, the Principal and _____ ("Surety") are held and firmly bound unto all laborers, material men, and other persons referred to in said statutes in the sum of _____ Dollars (\$_____), lawful money of the United States, being a sum not less than the total amount payable by the terms of Contract, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The condition of this obligation is that if the Principal or any of his or its subcontractors, of the heirs, executors, administrators, successors, or assigns of any, all, or either of them shall fail to pay for any labor, materials, provisions, provender, or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal or any of his or its subcontractors of any tier under Section 13020 of the Unemployment Insurance Code with respect to such work or labor, that the Surety will pay the same in an amount not exceeding the amount herein above set forth, and also in case suit is brought upon this bond, will pay a reasonable attorney's fee to be awarded and fixed by the Court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under section 9100 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void; otherwise it shall be and remain in full force and affect.

And the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of Contract or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20____.

Principal

Surety

By

By

Name of California Agent of Surety

Address of California Agent of Surety

Telephone No. of California Agent of Surety

Developer must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

PERFORMANCE BOND
(100% of Contract Price)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Tracy Unified School District, ("District") and _____ ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

WEST HIGH SCHOOL AG ADDITION

("Project" or "Contract") which Contract dated _____, 2024, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, said Principal is required under the terms of the Contract to furnish a bond for the faithful performance of the Contract.

NOW, THEREFORE, the Principal and _____ ("Surety") are held and firmly bound unto the Board of the District in the penal sum of

Dollars (\$ _____), lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents, to:

- Promptly perform all the work required to complete the Project; and
- Pay to the District all damages the District incurs as a result of the Principal's failure to perform all the Work required to complete the Project.

Or, at the District's sole discretion and election, the Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by the District of the lowest responsible bidder, arrange for a contract between such bidder and the District and make available as Work progresses sufficient funds to pay the cost of completion less the "balance of the Contract Price," and to pay and perform all obligations of Principals under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of liquidated damages. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by the District under the Contract and any modifications thereto, less the amount previously paid by the District to the Principal, less any withholdings by the District allowed under the Contract. District shall not be required or obligated to accept a tender of a completion contractor from the Surety for any or no reason.

The condition of the obligation is such that, if the above bounden Principal, his or its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions, and agreements in the Contract and any alteration thereof made as therein provided, on his or its part to be kept and performed at the time and in the intent and meaning, including all contractual guarantees and warranties of materials and workmanship, and shall indemnify and save harmless the District, its trustees, officers and agents,

as therein stipulated, then this obligation shall become null and void, otherwise it shall be and remain in full force and virtue.

Surety expressly agrees that the District may reject any contractor or subcontractor proposed by Surety to fulfill its obligations in the event of default by the Principal. Surety shall not utilize Principal in completing the Work nor shall Surety accept a Bid from Principal for completion of the Work if the District declares the Principal to be in default and notifies Surety of the District's objection to Principal's further participation in the completion of the Work.

As a condition precedent to the satisfactory completion of the Contract, the above obligation shall hold good for a period equal to the warranty and/or guarantee period of the Contract, during which time Surety's obligation shall continue if Developer shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of Developer remains. Nothing herein shall limit the District's rights or the Developer or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the work or to the specifications.

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20____.

Principal

Surety

By

By

Name of California Agent of Surety

Address of California Agent of Surety

Telephone No. of California Agent of Surety

Developer must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

REGISTERED SUBCONTRACTORS LIST
(Labor Code Section 1771.1)

PROJECT: WEST HIGH SCHOOL AG ADDITION

Date Submitted (for Updates): _____

1. Developer acknowledges and agrees that it must clearly set forth below the name and Department of Industrial Relations (DIR) registration number of each subcontractor **for all tiers** who will perform work or labor or render service to Developer or its subcontractors in or about the construction of the Work **at least two (2) weeks before the subcontractor is scheduled to perform work**. This document is to be updated as all tiers of subcontractors are identified.
2. **Developer** acknowledges and agrees that, if Developer fails to list as to any subcontractor of any tier who performs any portion of Work, the Contract is subject to cancellation and the Developer will be subjected to penalty under applicable law.

If further space is required for the list of proposed subcontractors, attach additional copies of page 2 showing the required information, as indicated below.

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

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Subcontractor Name: _____

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Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Date: _____

Proper Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

HAZARDOUS MATERIALS
PROCEDURES & REQUIREMENTS

1. Summary

This document includes information applicable to hazardous materials and hazardous waste abatement.

2. Notice of Hazardous Waste or Materials

- a. Developer shall give notice in writing to the District, the Construction Manager, and the Architect promptly, before any of the following materials are disturbed, and in no event later than twenty-four (24) hours after first observance, of any:
 - (1) Material that Developer believes may be a material that is hazardous waste or hazardous material, as defined in section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law;
 - (2) Other material that may present a substantial danger to persons or property exposed thereto in connection with Work at the site.
- b. Developer's written notice shall indicate whether the hazardous waste or material was shown or indicated in the Contract Documents to be within the scope of Work, and whether the materials were brought to the site by Developer, its Subcontractors, suppliers, or anyone else for whom Developer is responsible. As used in this section the term "hazardous materials" shall include, without limitation, asbestos, lead, Polychlorinated biphenyl (PCB), petroleum and related hydrocarbons, and radioactive material.
- c. In response to Developer's written notice, the District shall investigate the identified conditions.
- d. If the District determines that conditions do not involve hazardous materials or that no change in terms of Contract is justified, the District shall so notify Developer in writing, stating reasons. If the District and Developer cannot agree on whether conditions justify an adjustment in Contract Price or Contract Time, or on the extent of any adjustment, Developer shall proceed with the Work as directed by the District.
- e. If after receipt of notice from the District, Developer does not agree to resume Work based on a reasonable belief it is unsafe, or does not agree to resume Work under special conditions, then District may order such portion of Work that is in connection with such hazardous condition or such affected area to be deleted from the Work, or performed by others, or District may invoke its rights to terminate the Contract in whole or in part. District will determine entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Time as a result of deleting such portion of Work, or performing the Work by others.

- f. If Developer stops Work in connection with any hazardous condition and in any area affected thereby, Developer shall immediately redeploy its workers, equipment, and materials, as necessary, to other portions of the Work to minimize delay and disruption.

3. Additional Warranties and Representations

- a. Developer represents and warrants that it, its employees, and its subcontractors and their employees, shall at all times have the required levels of familiarity with the Site and the Work, training, and ability to comply fully with all applicable laws and contractual requirements for safe and expeditious performance of the Work, including whatever training is or may be required regarding the activities to be performed (including, but not limited to, all training required to address adequately the actual or potential dangers of Contract performance).
- b. Developer represents and warrants that it, its employees, and its subcontractors and their employees, shall at all times have and maintain in good standing any and all certifications and licenses required by applicable federal, state, and other governmental and quasi-governmental requirements applicable to the Work.
- c. Developer represents and warrants that it has studied carefully all requirements of the Specifications regarding procedures for demolition, hazardous waste abatement, or safety practices, specified in the Contract, and prior to submitting its bid, has either (a) verified to its satisfaction that the specified procedures are adequate and sufficient to achieve the results intended by the Contract Documents, or (b) by way of approved "or equal" request or request for clarification and written Addenda, secured changes to the specified procedures sufficient to achieve the results intended by the Contract Documents. Developer accepts the risk that any specified procedure will result in a completed Project in full compliance with the Contract Documents.

4. Monitoring and Testing

- a. District reserves the right, in its sole discretion, to conduct air monitoring, earth monitoring, Work monitoring, and any other tests (in addition to testing required under the agreement or applicable law), to monitor Contract requirements of safe and statutorily compliant work methods and (where applicable) safe re-entry level air standards under state and federal law upon completion of the job, and compliance of the work with periodic and final inspection by public and quasi-public entities having jurisdiction.
- b. Developer acknowledges that District has the right to perform, or cause to be performed, various activities and tests including, but not limited to, pre-abatement, during abatement, and post-abatement air monitoring, that District shall have no obligation to perform said activities and tests, and that a portion of said activities and tests may take place prior to the completion of the Work by Developer. In the event District elects to perform these activities and tests, Developer shall afford District ample access to the Site and all areas of the Work as may be necessary for the performance of these activities and tests. Developer will include the potential impact of these

activities or tests by District in the Contract Price and the Scheduled Completion Date.

- c. Notwithstanding District's rights granted by this paragraph, Developer may retain its own industrial hygiene consultant at Developer's own expense and may collect samples and may perform tests including, but not limited to, pre-abatement, during abatement, and post-abatement personal air monitoring, and District reserves the right to request documentation of all such activities and tests performed by Developer relating to the Work and Developer shall immediately provide that documentation upon request.

5. Compliance with Laws

- a. Developer shall perform safe, expeditious, and orderly work in accordance with the best practices and the highest standards in the hazardous waste abatement, removal, and disposal industry, the applicable law, and the Contract Documents, including, but not limited to, all responsibilities relating to the preparation and return of waste shipment records, all requirements of the law, delivering of all requisite notices, and obtaining all necessary governmental and quasi-governmental approvals.
- b. Developer represents that it is familiar with and shall comply with all laws applicable to the Work or completed Work including, but not limited to, all federal, state, and local laws, statutes, standards, rules, regulations, and ordinances applicable to the Work relating to:
 - (1) The protection of the public health, welfare and environment;
 - (2) Storage, handling, or use of asbestos, PCB, lead, petroleum based products, radioactive material, or other hazardous materials;
 - (3) The generation, processing, treatment, storage, transport, disposal, destruction, or other management of asbestos, PCB, lead, petroleum, radioactive material, or hazardous waste materials or other waste materials of any kind; and
 - (4) The protection of environmentally sensitive areas such as wetlands and coastal areas.

6. Disposal

- a. Developer has the sole responsibility for determining current waste storage, handling, transportation, and disposal regulations for the job Site and for each waste disposal facility. Developer must comply fully at its sole cost and expense with these regulations and any applicable law. District may, but is not obligated to, require submittals with this information for it to review consistent with the Contract Documents.
- b. Developer shall develop and implement a system acceptable to District to track hazardous waste from the Site to disposal, including appropriate "Hazardous Waste Manifests" on the EPA form, so that District may track the volume of waste it put in each landfill and receive from each landfill a certificate of receipt.

- c. Developer shall provide District with the name and address of each waste disposal facility prior to any disposal, and District shall have the express right to reject any proposed disposal facility. Developer shall not use any disposal facility to which District has objected. Developer shall document actual disposal or destruction of waste at a designated facility by completing a disposal certificate or certificate of destruction forwarding the original to the District.

7. Permits

- a. Before performing any of the Work, and at such other times as may be required by applicable law, Developer shall deliver all requisite notices and obtain the approval of all governmental and quasi-governmental authorities having jurisdiction over the Work. Developer shall submit evidence satisfactory to District that it and any disposal facility:
 - (1) have obtained all required permits, approvals, and the like in a timely manner both prior to commencement of the Work and thereafter as and when required by applicable law; and
 - (2) are in compliance with all such permits, approvals and the regulations.

For example, before commencing any work in connection with the Work involving asbestos-containing materials, or PCBs, or other hazardous materials subject to regulation, Developer agrees to provide the required notice of intent to renovate or demolish to the appropriate state or federal agency having jurisdiction, by certified mail, return receipt requested, or by some other method of transmittal for which a return receipt is obtained, and to send a copy of that notice to District. Developer shall not conduct any Work involving asbestos-containing materials or PCBs unless Developer has first confirmed that the appropriate agency having jurisdiction is in receipt of the required notification. All permits, licenses, and bonds that are required by governmental or quasi-governmental authorities, and all fees, deposits, tap fees, offsite easements, and asbestos and PCB disposal facilities expenses necessary for the prosecution of the Work, shall be procured and paid for by Developer. Developer shall give all notices and comply with the all applicable laws bearing on the conduct of the Work as drawn and specified. If Developer observes or reasonably should have observed that Plans and Specifications and other Contract Documents are at variance therewith, it shall be responsible for promptly notifying District in writing of such fact. If Developer performs any Work contrary to applicable laws, it shall bear all costs arising therefrom.

- b. In the case of any permits or notices held in District's name or of necessity to be made in District's name, District shall cooperate with Developer in securing the permit or giving the notice, but the Developer shall prepare for District review and execution upon approval, all necessary applications, notices, and other materials.

8. Indemnification

To the fullest extent permitted by law, the indemnities and limitations of liability expressed throughout the Contract Documents apply with equal force and effect to any claims or liabilities imposed or existing by virtue of the removal, abatement, and disposal of hazardous waste. This includes, but is not limited to, liabilities connected to the selection and use of a waste disposal facility, a waste transporter, personal injury, property damage, loss of use of property, damage to the environment or natural resources, or "disposal" and "release" of materials associated with the Work (as defined in 42 U.S.C. § 9601 *et seq.*).

9. Termination

District shall have an absolute right to terminate for default immediately without notice and without an opportunity to cure should Developer knowingly or recklessly commit a material breach of the terms of the Contract Documents, or any applicable law, on any matter involving the exposure of persons or property to hazardous waste. However, if the breach of contract exposing persons or property to hazardous waste is due solely to an ordinary, unintentional, and non-reckless failure to exercise reasonable care, then the procedures for termination for cause shall apply without modification.

END OF DOCUMENT

WORKERS' COMPENSATION CERTIFICATION

1. Labor Code section 3700, in relevant part, provides:
 - a. Every employer except the State shall secure the payment of compensation in one or more of the following ways:
 - b. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state; and/or
 - c. By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees.
2. I am aware of the provisions of section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the Work of this Contract.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

(In accordance with Labor Code sections 1860 and 1861, the above certificate must be signed and filed with the awarding body prior to performing any Work under this Contract.)

END OF DOCUMENT

**PREVAILING WAGE AND
RELATED LABOR REQUIREMENTS CERTIFICATION**

I hereby certify that I will conform to the State of California Public Works Contract requirements regarding prevailing wages, benefits, on-site audits with 48-hours' notice, payroll records, and apprentice and trainee employment requirements, for all Work on the above Project including, without limitation, labor compliance monitoring and enforcement by the Department of Industrial Relations.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

**DISABLED VETERAN BUSINESS
ENTERPRISE PARTICIPATION CERTIFICATION**

GENERAL INSTRUCTIONS

Section 17076.11 of the Education Code requires school districts using, or planning to use, funds allocated pursuant to the State of California School Facility Program ("Program") for the construction and/or modernization of school buildings to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%) per year of the overall dollar amount expended each year by the school district on projects that receive state funding. Therefore, lowest responsive responsible bidder awarded the Contract must submit this document to the District with its executed Agreement, identifying the steps Developer took to solicit DVBE participation in conjunction with this Contract. Do not submit this form with your bids.

– Method of Compliance with DVBE Participation Goals. Check the appropriate box to indicate your method of committing the contract dollar amount.

YOUR BUSINESS ENTERPRISE IS:	AND YOU WILL	AND YOU WILL
☐ Disabled veteran owned and your forces will perform at least 3% of this Contract	Include a copy of your DVBE letter from Office of Small Business and Disabled Veterans Business Enterprise Services ("OSB")*	Complete Part 1 of this form and the Certification
☐ Disabled veteran owned but is unable to perform 3% of this Contract with your forces	Use DVBE subcontractors /suppliers to bring the Contract participation to at least 3%	Include a copy of each DVBE's letter from OSB (including yours, if applicable), and complete Part 1 of this form and the certification
☐ NOT disabled veteran owned	Use DVBE subcontractors /suppliers for at least 3% of this Contract	
☐ Unable to meet the required participation goals	Complete all of this Certification form	

* A DVBE letter from OSB is obtained from the participating DVBE.

You must complete the following table to show the dollar amount of DVBE participation:

	TOTAL CONTRACT PRICE
A. Prime Bidder, if DVBE (own participation)	\$
DVBE Subcontractor or Supplier	
Subtotal (A & B)	
Non-DVBE	
Total Bid	

– **Contacts.** To identify DVBE subcontractors/suppliers for participation in your contract, you must contact each of the following categories. You should contact several DVBE organizations.

CATEGORY	TELEPHONE NUMBER	DATE CONTACTED	PERSON CONTACTED
The District, if any			*
OSB, which publishes a list of DVBE's; Internet Address: http://www.dgs.ca.gov/osbcr	(916) 323-5478 (916) 322-5060		*
DVBE Organization (List)			*

*Write "recorded message" in this column, if applicable.

– **Advertisement.** You must advertise for DVBE participation in both a trade and focus paper. List the advertisement you place to solicit DVBE participation. Advertisements should be published at least fourteen (14) days prior to bid/proposal opening; if you cannot advertise fourteen (14) days prior, advertisements should be published as soon as possible. Advertisements must include that your firm is seeking DVBE participation, the project name and location, and you firm's name, your contact person, and telephone number. Attach copies of advertisements to this form.

FOCUS/TRADE PAPER NAME	CHECK ONE		DATE OF ADVERTISEMENT
	TRADE	FOCUS	

– **DVBE Solicitations.** List DVBE subcontractors/suppliers that were invited to bid. Use the following instructions to complete the remainder of this section (read the three columns as a sentence from left to right). If you need additional space to list DVBE solicitations, please use a separate page and attach to this form.

IF THE DVBE.....	THEN.....		AND.....	
was selected to participate	Check "yes" in the "SELECTED" column		include a copy of their DVBE letter(s) from OSB	
was NOT selected to participate	Check "NO" in the "SELECTED" column		state why in the "REASON NOT SELECTED" column	
did not respond to your solicitation	Check the "NO RESPONSE" column.			
DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	SELECTED		REASON NOT SELECTED	NO RESPONSE
	YES	NO		

A copy of this form must be retained by you and may be subject to a future audit.

CERTIFICATION

I, _____ certify that I am the Developer's _____
_____ and that I have made a diligent effort to ascertain the facts with regard to
the representations made herein.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DRUG-FREE WORKPLACE CERTIFICATION

1. This Drug-Free Workplace Certification form is required from the successful Bidder pursuant to Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or service from any state agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract or grant awarded by a state agency may be subject to suspension of payments or termination of the contract or grant, and the contractor or grantee may be subject to debarment from future contracting, if the contracting agency determines that specified acts have occurred.
2. The District is not a "state agency" as defined in the applicable section(s) of the Government Code, but the District is a local agency and public school district under California law and requires all contractors on District projects to comply with the provisions and requirements of Government Code section 8350 et seq., the Drug-Free Workplace Act of 1990.

Developer shall certify that it will provide a drug-free workplace by doing all of the following:

- a. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited in the person's or organization's workplace and specifying actions which will be taken against employees for violations of the prohibition.
 - a. Establishing a drug-free awareness program to inform employees about all of the following:
 - (1) The dangers of drug abuse in the workplace.
 - (2) The person's or organization's policy of maintaining a drug-free workplace.
 - (3) The availability of drug counseling, rehabilitation, and employee-assistance programs.
 - (4) The penalties that may be imposed upon employees for drug abuse violations.
 - b. Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required above, and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.
3. I, the undersigned, agree to fulfill the terms and requirements of Government Code section 8355 listed above and will publish a statement notifying employees concerning (a) the prohibition of controlled substance at the workplace, (b) establishing a drug-free awareness program, and (c) requiring that each employee engaged in the performance

of the Contract be given a copy of the statement required by section 8355(a), and requiring that the employee agree to abide by the terms of that statement.

4. I also understand that if the District determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of section 8355, that the Contract awarded herein is subject to termination, suspension of payments, or both. I further understand that, should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of the aforementioned Act.

I acknowledge that I am aware of the provisions of Government Code section 8350 et seq. and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

TOBACCO-FREE ENVIRONMENT CERTIFICATION

1. Pursuant to, without limitation, 20 U.S.C. section 6083, Labor Code section 6400 et seq., Health & Safety Code section 104350 et seq., and District Board policies, all District sites, including the Project site, are tobacco-free environments. Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school-owned vehicles and vehicles owned by others while on District property.
2. I acknowledge that I am aware of the District's policy regarding tobacco-free environments at District sites, including the Project site and hereby certify that I will adhere to the requirements of that policy and not permit any of my firm's employees, agents, subcontractors, or my firm's subcontractors' employees or agents, to use tobacco and/or smoke on the Project site.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

HAZARDOUS MATERIALS CERTIFICATION

1. Developer hereby certifies that no asbestos, or asbestos-containing materials, polychlorinated biphenyl (PCB), or any material listed by the federal or state Environmental Protection Agency or federal or state health agencies as a hazardous material, or any other material defined as being hazardous under federal or state laws, rules, or regulations ("New Hazardous Material"), shall be furnished, installed, or incorporated in any way into the Project or in any tools, devices, clothing, or equipment used to affect any portion of Developer's work on the Project for District.
2. Developer further certifies that it has instructed its employees with respect to the above-mentioned standards, hazards, risks, and liabilities.
 - a. Asbestos and/or asbestos-containing material shall be defined as all items containing but not limited to chrysotile, crocidolite, amosite, anthophyllite, tremolite, and actinolite. Any or all material containing greater than one-tenth of one percent (0.1%) asbestos shall be defined as asbestos-containing material.
3. Any disputes involving the question of whether or not material is New Hazardous Material shall be settled by electron microscopy or other appropriate and recognized testing procedure, at the District's determination. The costs of any such tests shall be paid by Developer if the material is found to be New Hazardous Material.
4. All Work or materials found to be New Hazardous Material or Work or material installed with equipment containing New Hazardous Material will be immediately rejected and this Work will be removed at Developer's expense at no additional cost to the District.

Developer has read and understood the document titled Hazardous Materials Procedures & Requirements, and shall comply with all the provisions outlined therein.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

LEAD-BASED MATERIALS CERTIFICATION

This certification provides notice to the Developer that:

- (1) Developer's work may disturb lead-containing building materials.
- (2) Developer shall notify the District if any work may result in the disturbance of lead-containing building materials.
- (3) Developer shall comply with the Renovation, Repair and Painting Rule, if lead-based paint is disturbed in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors.

1. Lead as a Health Hazard

Lead poisoning is recognized as a serious environmental health hazard facing children today. Even at low levels of exposure, much lower than previously believed, lead can impair the development of a child's central nervous system, causing learning disabilities, and leading to serious behavioral problems. Lead enters the environment as tiny lead particles and lead dust disburges when paint chips, chalks, peels, wears away over time, or is otherwise disturbed. Ingestion of lead dust is the most common pathway of childhood poisoning; lead dust gets on a child's hands and toys and then into a child's mouth through common hand-to-mouth activity. Exposures may result from construction or remodeling activities that disturb lead paint, from ordinary wear and tear of windows and doors, or from friction on other surfaces.

Ordinary construction and renovation or repainting activities carried out without lead-safe work practices can disturb lead-based paint and create significant hazards. Improper removal practices, such as dry scraping, sanding, or water blasting painted surfaces, are likely to generate high volumes of lead dust.

Because the Developer and its employees will be providing services for the District, and because the Developer's work may disturb lead-containing building materials, DEVELOPER IS HEREBY NOTIFIED of the potential presence of lead-containing materials located within certain buildings utilized by the District. All school buildings built prior to 1978 are presumed to contain some lead-based paint until sampling proves otherwise.

2. Overview of California Law

Education Code section 32240 et seq. is known as the Lead-Safe Schools Protection Act. Under this act, the Department of Health Services is to conduct a sample survey of schools in the State of California for the purpose of developing risk factors to predict lead contamination in public schools. (Ed. Code, § 32241.)

Any school that undertakes any action to abate existing risk factors for lead is required to utilize trained and state-certified contractors, inspectors, and workers. (Ed. Code, § 32243, subd. (b).) Moreover, lead-based paint, lead plumbing, and solders, or other potential sources of lead contamination, shall not be utilized in the construction of any new school facility or the modernization or renovation of any existing school facility. (Ed. Code, § 32244.)

Both the Federal Occupational Safety and Health Administration ("Fed/OSHA") and the California Division of Occupational Safety and Health ("Cal/OSHA") have implemented

safety orders applicable to all construction work where a contractor's employee may be occupationally exposed to lead.

The OSHA Regulations apply to all construction work where a contractor's employee may be occupationally exposed to lead. The OSHA Regulations contain specific and detailed requirements imposed on contractors subject to those regulations. The OSHA Regulations define construction work as work for construction, alteration, and/or repair, including painting and decorating. Regulated work includes, but is not limited to, the following:

- a. Demolition or salvage of structures where lead or materials containing lead are present;
- b. Removal or encapsulation of materials containing lead;
- c. New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;
- d. Installation of products containing lead;
- e. Lead contamination/emergency cleanup;
- f. Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed; and
- g. Maintenance operations associated with the construction activities described in the subsection.

Because it is assumed by the District that all painted surfaces (interior as well as exterior) within the District contain some level of lead, it is imperative that the Developer, its workers and subcontractors fully and adequately comply with all applicable laws, rules and regulations governing lead-based materials (including title 8, California Code of Regulations, section 1532.1).

Developer shall notify the District if any Work may result in the disturbance of lead-containing building materials. Any and all Work that may result in the disturbance of lead-containing building materials shall be coordinated through the District. A signed copy of this Certification shall be on file prior to beginning Work on the Project, along with all current insurance certificates.

3. Renovation, Repair and Painting Rule, Section 402(c)(3) of the Toxic Substances Control Act

The EPA requires lead safe work practices to reduce exposure to lead hazards created by renovation, repair and painting activities that disturb lead-based paint. Pursuant to the Renovation, Repair and Painting Rule (RRP), renovations in homes, childcare facilities, and schools built prior to 1978 must be conducted by certified renovations firms, using renovators with training by a EPA-accredited training provider, and fully and adequately complying with all applicable laws, rules and regulations governing lead-based materials, including those rules and regulations appearing within title 40 of the Code of Federal Regulations as part 745 (40 CFR 745).

The RRP requirements apply to all contractors who disturb lead-based paint in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors. If a DPH-certified inspector or risk assessor determines that a home constructed before 1978

is lead-free, the federal certification is not required for anyone working on that particular building.

4. Developer's Liability

If the Developer fails to comply with any applicable laws, rules, or regulations, and that failure results in a site or worker contamination, the Developer will be held solely responsible for all costs involved in any required corrective actions, and shall defend, indemnify, and hold harmless the District, pursuant to the indemnification provisions of the Contract, for all damages and other claims arising therefrom.

If lead disturbance is anticipated in the Work, only persons with appropriate accreditation, registrations, licenses, and training shall conduct this Work.

It shall be the responsibility of the Developer to properly dispose of any and all waste products, including, but not limited to, paint chips, any collected residue, or any other visual material that may occur from the prepping of any painted surface. It will be the responsibility of the Developer to provide the proper disposal of any hazardous waste by a certified hazardous waste hauler. This company shall be registered with the Department of Transportation (DOT) and shall be able to issue a current manifest number upon transporting any hazardous material from any school site within the District.

The Developer shall provide the District with any sample results prior to beginning Work, during the Work, and after the completion of the Work. The District may request to examine, prior to the commencement of the Work, the lead training records of each employee of the Developer.

THE DEVELOPER HEREBY ACKNOWLEDGES, UNDER PENALTY OF PERJURY, THAT IT:

1. HAS RECEIVED NOTIFICATION OF POTENTIAL LEAD-BASED MATERIALS ON THE OWNER'S PROPERTY;
2. IS KNOWLEDGEABLE REGARDING AND WILL COMPLY WITH ALL APPLICABLE LAWS, RULES, AND REGULATIONS GOVERNING WORK WITH, AND DISPOSAL, OF LEAD.

THE UNDERSIGNED WARRANTS THAT HE/SHE HAS THE AUTHORITY TO SIGN ON BEHALF OF AND BIND THE DEVELOPER. THE DISTRICT MAY REQUIRE PROOF OF SUCH AUTHORITY.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

IMPORTED MATERIALS CERTIFICATION

1. This form shall be executed by all entities that, in any way, provide or deliver and/or supply any soils, aggregate, or related materials ("Fill") to the Project Site and shall be provided to the District at least ten (10) days before delivery. All Fill shall satisfy all requirements of any environmental review of the Project performed pursuant to the statutes and guidelines of the California Environmental Quality Act, section 21000 et seq. of the Public Resources Code ("CEQA"), and all requirements of section 17210 et seq. of the Education Code, including requirements for a Phase I environmental assessment acceptable to the State of California Department of Education and Department of Toxic Substances Control.

Certification of: ☐ Delivery Firm/Transporter ☐ Supplier ☐ Manufacturer
☐ Wholesaler ☐ Broker ☐ Retailer
☐ Distributor ☐ Other _____

Type of Entity ☐ Corporation ☐ General Partnership
☐ Limited Partnership ☐ Limited Liability Company
☐ Sole Proprietorship ☐ Other _____

Name of firm ("Firm"): _____

Mailing address: _____

Addresses of branch office used for this Project: _____

If subsidiary, name and address of parent company: _____

2. By my signature below, I hereby certify that I am aware of section 25260 of the Health and Safety Code and the sections referenced therein regarding the definition of hazardous material. I further certify on behalf of the Firm that all soils, aggregates, or related materials provided, delivered, and/or supplied or that will be provided, delivered, and/or supplied by this Firm to the Project Site are free of any and all hazardous material as defined in section 25260 of the Health and Safety Code. I further certify that I am authorized to make this certification on behalf of the Firm.

Date: _____

Name of Firm: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

**CRIMINAL BACKGROUND
INVESTIGATION/FINGERPRINTING CERTIFICATION**

The undersigned does hereby certify to the governing board of the District as follows:

1. That I am a representative of the Developer currently under contract with the District; that I am familiar with the facts herein certified; and that I am authorized and qualified to execute this certificate on behalf of Developer.

Developer certifies that it has taken at least one of the following actions with respect to the construction Project that is the subject of the Contract (check all that apply):

- ☐ The Developer is a sole proprietor and intends to comply with the fingerprinting requirements of Education Code section 45125.1(k) with respect to all Developer's employees who may have contact with District pupils in the course of providing services pursuant to the Contract, and hereby agrees to the District's preparation and submission of fingerprints such that the California Department of Justice may determine that none of those employees has been convicted of a felony, as that term is defined in Education Code section 45122.1. No work shall commence until such determination by DOJ has been made.

As an authorized District official, I am familiar with the facts herein certified, and am authorized to execute this certificate on behalf of the District and undertake to prepare and submit Developer's fingerprints as if he or she was an employee of the District.

Date: _____

District Representative's Name and Title: _____

District Representative's Signature: _____

- ☐ The Developer, who is not a sole proprietor, has complied with the fingerprinting requirements of Education Code section 45125.1 with respect to all Developer's employees and all of its Subcontractors' employees who may have contact with District pupils in the course of providing services pursuant to the Contract, and the California Department of Justice has determined that none of those employees has been convicted of a felony, as that term is defined in Education Code section 45122.1. A complete and accurate list of Developer's employees and of all of its subcontractors' employees who may come in contact with District pupils during the course and scope of the Contract is attached hereto; and/or
- ☐ Pursuant to Education Code section 45125.2, Developer has installed or will install, prior to commencement of Work, a physical barrier at the Work Site, that will limit contact between Developer's employees and District pupils at all times; and/or
- ☐ Pursuant to Education Code section 45125.2, Developer certifies that all employees will be under the continual supervision of, and monitored by, an employee of the Developer who the California Department of Justice has ascertained, or as described below, will ascertain, has not been convicted of a violent or serious felony. The name and title of the employee who will be supervising Developer's and its subcontractors' employees is:

Name: _____

Title: _____

NOTE: If the Developer is a sole proprietor, and elects the above option, Developer must have the above-named employee's fingerprints prepared and submitted by the District, in accordance with Education Code section 45125.1(k). No work shall commence until such determination by DOJ has been made.

As an authorized District official, I am familiar with the facts herein certified, and am authorized to execute this certificate on behalf of the District and undertake to prepare and submit Developer's fingerprints as if he or she was an employee of the District.

Date: _____

District Representative's Name and Title: _____

District Representative's Signature: _____

- ☐ *The Work on the Contract is either (i) at an unoccupied school site and no employee and/or subcontractor or supplier of any tier of the Contract shall come in contact with the District pupils or (ii) Developer's employees or any subcontractor or supplier of any tier of the Contract will have only limited contact, if any, with District pupils and the District will take appropriate steps to protect the safety of any pupils that may come in contact with Consultant's employees, subcontractors or suppliers so that the fingerprinting and criminal background investigation requirements of Education Code section 45125.1 shall not apply to Developer under the Contract.*

As an authorized District official, I am familiar with the facts herein certified, and am authorized to execute this certificate on behalf of the District.

Date: _____

District Representative's Name and Title: _____

District Representative's Signature: _____

Developer's responsibility for background clearance extends to all of its employees, Subcontractors, and employees of Subcontractors coming into contact with District pupils regardless of whether they are designated as employees or acting as independent contractors of the Developer.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

ROOFING PROJECT CERTIFICATION

1. This form shall be executed by all contractors, materials manufacturers, or vendors involved in a bid or proposal for the repair or replacement of a roof of a public school building where the project is either for repair of more than 25% of the roof or that has a total cost more than \$21,000 ("roofing project") and submitted to the District when the award is made.

Certification of:

☐ Contractor	☐ Materials Manufacturer
☐ Vendor	☐ Other _____

I, _____, _____, certify that I have not
[Name] [Name of Firm]
offered, given, or agreed to give, received, accepted, or agreed to accept, any gift,
contribution, or any financial incentive whatsoever to or from any person in connection with
the roofing project contract. As used in this certification, "person" means any natural
person, business, partnership, corporation, union, committee, club, or other organization,
entity, or group of individuals.

Furthermore, I, _____, _____, certify that
[Name] [Name of Firm]

I do not have, and throughout the duration of the contract, I will not have, any financial relationship in connection with the performance of this contract with any architect, engineer, roofing consultant, materials manufacturer, distributor, or vendor that is not disclosed below.

I, _____, have the following

[Name] [Name of Firm]

financial relationships with an architect, engineer, roofing consultant, materials manufacturer, distributor, or vendor, or other person in connection with the following roofing project contract (provide Name and Address of Building, and Contract Date and Number):

[illegible]

2. By my signature below, I hereby certify that, to the best of my knowledge, the contents of this disclosure are true, or are believed to be true. I further certify on behalf of the Firm that I am aware of section 3000 et seq. of the California Public Contract Code, and the sections referenced therein regarding the penalties for providing false information or failing to disclose a financial relationship in this disclosure. I further certify that I am authorized to make this certification on behalf of the Firm.

Date: _____

Name of Firm: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

SKILLED AND TRAINED WORKFORCE CERTIFICATION

The undersigned does hereby certify to the governing board of the District as follows:

That I am a representative of the Developer currently performing work on the Project; that I am familiar with the facts herein certified; and that I am authorized and qualified to execute this certificate on behalf of Developer.

That Developer and its subcontractors at every tier will use a Skilled and Trained Workforce to perform all work on the Contract or Project that falls within an apprenticeable occupation in the building and construction trades in accordance with Public Contract Code section 2600 et seq.

"Apprenticeable occupation" means an occupation for which the Chief of the Division of Apprenticeship Standards of the Department of Industrial Relations ("Chief") had approved an apprenticeship program pursuant to Section 3075 of the Labor Code before January 1, 2014.

"Skilled and Trained Workforce" means a workforce that meets all of the following conditions:

1. All of the workers are either skilled journeypersons or apprentices registered in an apprenticeship program approved by the Chief.
2. The percentage of either (A) skilled journeypersons employed by the Developer or subcontractor to perform work on the Contract or Project who are graduates of an apprenticeship program for the applicable occupation, or (B) hours of work performed by skilled journeypersons employed by Developer or subcontractor to perform work on the Contract or Project who are graduates of an apprenticeship program for the applicable occupation, is at least equal to the percentages set forth in the following chart for the applicable month:

APPLICABLE DATES	% REQUIREMENT	EXCLUDED OCCUPATIONS
1/1/2018 – 12/31/2018	At least 30%	Teamster – 0%.
1/1/2019 – 12/31/2019	At least 40%	Teamster – 0%.
1/1/2020 – 12/31/2020	At least 50%	Acoustical installer, bricklayer, carpenter, cement mason, drywall installer or lather, marble mason, finisher, or setter, modular furniture or systems installer, operating engineer, pile driver, plasterer, roofer or waterproofer, stone mason, surveyor, terrazzo worker or finisher, and tile layer, setter, or finisher – At least 30% for each trade.
1/1/2021 – 12/31/2021	At least 60%	

3. For an apprentice occupation in which no apprenticeship program has been approved by the Chief before January 1, 1995, up to one-half of the above graduation percentage requirements set forth in the above chart may be satisfied by skilled journeypersons who commenced working in the apprentice occupation before the Chief's approval of an apprenticeship program for that occupation in the county in which the Project is located.
4. The contractor or subcontractor need not meet the apprenticeship graduation requirements if:

- a. During a calendar month, the Developer or subcontractor employs skilled journeypersons to perform fewer than 10 hours of work on the Contract or Project; or
- b. The subcontractor was not a listed subcontractor under Public Contract Code section 4104 or a substitute for a listed subcontractor and the subcontract does not exceed one-half of 1 percent of the price of the prime contract.

That Developer and its subcontractors will demonstrate its compliance with the Skilled and Trained Workforce requirements by either of the following methods (check what applies):

- ☐ Using the form attached hereto, provide monthly reports to the District from the Developer and its subcontractors demonstrating that they are complying with the requirements of Public Contract Code section 2600 et seq., which shall be a public record under California Public Records Act, Government Code section 6250 et seq.; or
- ☐ Provide evidence that Developer and its subcontractors have agreed to be bound by: (1) a project labor agreement entered into by the District that binds all contractors and all its subcontractors at every tier performing work on the Project to use a skilled and trained workforce; (2) the extension or renewal of a project labor agreement entered into by the District prior to January 1, 2018; or (3) a project labor agreement that binds all contractors and all its subcontractors at every tier performing work on the Project to use a skilled and trained workforce.

I hereby certify that I am aware of the provisions of section 17407.5 of the Education Code and sections 2600 through 2602 of the Public Contract Code and will comply with such provisions during the performance of the Work of this Contract and will bind all of my subcontractors at every tier, with the exception of the subcontractors identified in Public Contract Code section 2602, to comply with such provisions.

Date: _____

Name of Developer: _____

Signature: _____

Print Name: _____

Title: _____

**SKILLED AND TRAINED ORKFORCE
MONTHLY REPORT
(COVER PAGE)**

NAME OF PROJECT: _____

NAME OF CONTRACTOR: _____

FOR THE MONTH OF: _____, 20____

The undersigned hereby certifies that all the workers employed by the above-referenced contractor performing work in an apprenticeable occupation in the building and construction trades on the Project are either skilled journeypersons or apprentices registered in an apprenticeship program approved by the Chief of the Division of Apprenticeship Standards of the Department of Industrial Relations.

The undersigned further certifies that the percentage of either (A) skilled journeypersons employed by the above-referenced contractor to perform work on the Project who are graduates of an apprenticeship program for the applicable occupation, or (B) hours of work performed by skilled journeypersons employed by the above-referenced contractor to perform work on the Project who are graduates of an apprenticeship program for the applicable occupation, is at least equal to the apprenticeship graduation percentage required by Public Contract Code section 2601 for the particular calendar month.

The undersigned has demonstrated compliance with the apprenticeship graduation percentage by completing the accompanying Worksheet(s). A true and correct Worksheet for each apprenticeable occupation in the building and construction trades utilized by the above-referenced contractor for the particular calendar month is attached hereto, **totaling** _____ **attached page(s).**

I certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: _____

Signature: _____

Print Name: _____

Title: _____

**SKILLED AND TRAINED
WORKFORCE MONTHLY REPORT
(WORKSHEET)**

NAME OF PROJECT: _____

NAME OF CONTRACTOR: _____

FOR THE MONTH OF: _____ 2024

Page ____ of ____ (Duplicate as needed. Submit a separate Worksheet for each
apprenticeable occupation in the building and construction trades utilized by contractor.)

***Apprenticeable occupation:**_____.

- A. If above-identified occupation is *acoustical installer, bricklayer, carpenter, cement mason, drywall installer or lather, marble mason, finisher, or setter, modular furniture or systems installer, operating engineer, pile driver, plasterer, roofer or waterproofer, stone mason, surveyor, terrazzo worker or finisher, and tile layer, setter, or finisher*, the apprenticeship graduation percentage requirement is at least 30 percent.
- B. If the above-identified occupation is any other apprenticeable occupation, *excluding teamsters and occupations listed in subparagraph A, above*, the apprenticeship graduation percentage requirement is at least at least 30 percent in 2018, 40 percent in 2019, 50 percent in 2020, 60 percent in 2021.

Demonstrate compliance for the above-identified occupation by either Number of Skilled Journeypersons or Number of Hours of Work Performed by Skilled Journeypersons. Check and complete the method of compliance that applies:

☐ **Number of Skilled Journeypersons:**

1. Number of skilled journeypersons performing work in the apprenticeable occupation: _____
2. Number of skilled journeypersons who are graduates of an apprenticeship program for the applicable occupation: _____

Percentage of skilled journeypersons who are graduates of an apprenticeship program for the applicable occupation (divide line 2 by line 1): _____%

☐ **Number of Hours of Work Performed by Skilled Journeypersons:**

1. Number of hours of work performed by skilled journeypersons in the apprenticeable occupation: _____
2. Number of hours of work performed by skilled journeypersons who are graduates of an apprenticeship program for the applicable occupation: _____

Percentage of hours of work performed by skilled journeypersons who are graduates of an apprenticeship program for the applicable occupation (divide line 2 by line 1): _____%

*This Worksheet incorporates by reference all definitions in Public Contract Code section 2601, including, without limitation, the definitions of "apprenticeable occupation," "graduate of an apprenticeship program," and "skilled journeypersons."

END OF DOCUMENT

ESCROW AGREEMENT IN LIEU OF RETENTION
Public Contract Code Section 22300

This Escrow Agreement ("Escrow Agreement") is made and entered into this _____ day of _____, 20____, by and between the Tracy Unified School District ("District"), whose address is 4665 Bernal Ave., Pleasanton, CA 94566, and _____ ("Developer"), whose address is _____, and _____ ("Escrow Agent"), a state or federally chartered bank in the state of California, whose address is _____.

For the consideration hereinafter set forth, District, Developer, and Escrow Agent agree as follows:

3. Pursuant to section 22300 of Public Contract Code of the State of California, which is hereby incorporated by reference, Developer has the following two (2) options:

- ☐ Deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by District pursuant to the Construction Contract No. _____ entered into between District and Developer for the _____ Project, in the amount of _____ Dollars (\$ _____), dated _____, 2024, (the "Contract"); **or**
- ☐ On written request of Developer, District shall make payments of the retention earnings for the above referenced Contract directly to Escrow Agent.

When Developer deposits the securities as a substitute for Contract earnings (first option), Escrow Agent shall notify District within ten (10) calendar days of the deposit. The market value of the securities at the time of substitution and at all times from substitution until the termination of the Escrow Agreement shall be at least equal to the cash amount then required to be withheld as retention under terms of Contract between District and Developer.

Securities shall be held in name of Tracy Unified School District, and shall designate Developer as beneficial owner.

4. District shall make progress payments to Developer for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in form and amount specified above.
3. When District makes payment of retention earned directly to Escrow Agent, Escrow Agent shall hold them for the benefit of Developer until the time that the escrow created under this Escrow Agreement is terminated. Developer may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the Parties shall be equally applicable and binding when District pays Escrow Agent directly.
4. Developer shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of District. The District will charge Developer \$ _____ for each of District's deposits to the escrow account. These expenses and payment terms shall be determined by District, Developer, and Escrow Agent.

5. Interest earned on securities or money market accounts held in escrow and all interest earned on that interest shall be for sole account of Developer and shall be subject to withdrawal by Developer at any time and from time to time without notice to District.
6. Developer shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from District to Escrow Agent that District consents to withdrawal of amount sought to be withdrawn by Developer.
7. District shall have the right to draw upon the securities and/or withdraw amounts from the Escrow Account in the event of default by Developer. Upon seven (7) days' written notice to Escrow Agent from District of the default, if applicable, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by District.
8. Upon receipt of written notification from District certifying that the Contract is final and complete, and that Developer has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Developer all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all monies and securities on deposit and payments of fees and charges.
9. Escrow Agent shall rely on written notifications from District and Developer pursuant to Paragraphs 5 through 8, inclusive, of this Escrow Agreement and District and Developer shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth above.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

10. Names of persons who are authorized to give written notice or to receive written notice on behalf of District and on behalf of Developer in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of District:

Title

Name

Signature

Address

On behalf of Escrow Agent:

Title

Name

Signature

Address

On behalf of Developer:

Title

Name

Signature

Address

At the time that the Escrow Account is opened, District and Developer shall deliver to Escrow Agent a fully executed copy of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

On behalf of District:

Title

Name

Signature

Address

On behalf of Developer:

Title

Name

Signature

Address

END OF DOCUMENT

NOTICE OF AWARD

DATED: _____ 20__

TO: _____ ("Developer")
[ADDRESS]

PROJECT: **WEST HIGH SCHOOL AG ADDITION**

CONTRACT NO.: _____ between the Tracy Unified School District ("District") and Developer ("Contract").

Developer has been awarded the above-referenced Contract on _____, 20__, by act of the District's Board.

The Developer shall execute and submit to District the following documents by no later than 5:00 p.m. on the **SEVENTH (7th)** calendar day following the date of this Notice of Award.

- 10.1 Site Lease.
- 10.2 Facilities Lease.
- 10.3 Insurance Certificates and Endorsements as required.
- 10.4 Registered Subcontractors List (Initial List): Include any designated Subcontractors of any tier from Developer's proposal. To be amended/supplemented following Subcontractor bidding.
- 10.5 Workers' Compensation Certification.
- 10.6 Prevailing Wage and Related Labor Requirements Certification.
- 10.7 Drug-Free Workplace Certification.
- 10.8 Tobacco-Free Environment Certification.
- 10.9 Hazardous Materials Certification.
- 10.10 Lead-Based Materials Certification.
- 10.11 Imported Materials Certification.
- 10.12 Criminal Background Investigation/Fingerprinting Certification.
- 10.13 Skilled and Trained Workforce Certification.
- 10.14 Escrow Agreement in Lieu of Retention (if used).

After Developer's timely compliance with those conditions, District will return a fully signed counterpart of the Contract and may then issue the Notice to Proceed with Preconstruction Services for the Project.

TRACY UNIFIED SCHOOL DISTRICT

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

NOTICE TO PROCEED WITH PRECONSTRUCTION SERVICES

DATED: _____ 20__

TO: _____ ("Developer")
[ADDRESS]

PROJECT: **WEST HIGH SCHOOL AG ADDITION**

CONTRACT NO.: _____ between the Tracy Unified School District ("District") and Developer ("Contract").

1. Developer is hereby notified that the Contract Time under the above Contract will commence to run on _____, 20__. By that date, Developer is to start performing its preconstruction services for the Project.
2. Preconstruction services will conclude upon approval of the Amendment to the Facilities Lease by District's Board, or termination of this Contract by either party per the Contract's terms.
3. No work for which a contractor is required to be licensed in accordance with the Business and Professions Code and for which Division of the State Architect (DSA) approval is required can be performed before receipt of DSA approval.

Developer shall not commence construction of the Project until the Notice to Proceed with Construction is issued by District following approval of the Amendment to the Facilities Lease by District's Board.

Thank you. We look forward to a very successful Project.

TRACY UNIFIED SCHOOL DISTRICT

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

NOTICE OF AWARD AFTER GUARANTEED MAXIMUM PRICE

DATED: _____ 20__

TO: _____ ("Developer")
[ADDRESS]

PROJECT: **WEST HIGH SCHOOL AG ADDITION**

CONTRACT NO.: _____ between the Tracy Unified School District ("District") and Developer ("Contract").

Amendment No. 1 to the Facilities Lease for the above-referenced Contract has been approved on _____, 20__, by act of the District's Board. The Guaranteed Maximum Price (GMP) for the Project is _____ Dollars (\$_____).

Developer shall fully execute the following documents on the forms provided in the Contract Documents as indicated on the forms and submit the same to District by no later than 5:00 p.m. on the **SEVENTH (7th)** calendar day following the date of this Notice of Amendment.

- 1.1 Performance Bond (100% of GMP).
- 1.2 Payment Bond (Contractor's Labor & Material Bond) (100% of GMP).
- 1.3 Disabled Veterans Business Enterprise Certification.

After Developer's timely compliance with those conditions, District may then issue the Notice to Proceed with Construction for the Project.

TRACY UNIFIED SCHOOL DISTRICT

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

NOTICE TO PROCEED WITH CONSTRUCTION

DATED: _____ 20__

TO: _____ ("Developer")

[ADDRESS]

PROJECT: **WEST HIGH SCHOOL AG ADDITION**

CONTRACT NO.: _____ between the Tracy Unified School District ("District") and Developer ("Contract").

Developer is hereby notified that the construction phase of the Project will commence on _____, 20___. In accordance with the Contract, Developer shall complete the Work by no later than _____, 20___.

Developer must submit the following documents by 5:00 p.m. on the **TENTH (10th)** calendar day following the date of this Notice to Proceed with Construction, and in no event later than the **FIRST (1st)** day on which Developer has workers employed on the construction phase of the Project:

- 1.1 Developer's preliminary schedule of construction.
- 1.2 Developer's preliminary schedule of values for all of the Work.
- 1.3 Developer's preliminary schedule of submittals, including Shop Drawings, Product Data, and Samples submittals
- 1.4 Developer's Safety Plan specifically adapted for the Project.
- 1.5 A complete list subcontractors of any and all tiers, including the name, address, telephone number, facsimile number, California State Contractors License number, classification, DIR registration number, and monetary value of all subcontracts for parties furnishing labor, material, or equipment for completion of the Project.

Thank you. We look forward to a very successful Project.

TRACY UNIFIED SCHOOL DISTRICT

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

APPLICATION AND CERTIFICATE FOR PAYMENT

TO:	PROJECT:	APPLICATION NO:	Distribution to:
		INVOICE NO:	Y DISTRICT
			Y ARCHITECT
		PERIOD TO:	Y DEVELOPER
			Y INSPECTOR OF RECORD
FROM:	JOB:	PROJECT NO:	Y 3 RD PARTY INSPECTOR
	ARCHITECT:	DSA FILE NO:	Y DISBURSEMENT AGENCY
		CONTRACT DATE:	

DEVELOPER'S APPLICATION FOR PAYMENT

Application is made for Payment as shown below, in connection with the Contract Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM	\$ _____
2. Net change by Change Orders	\$ _____
3. CONTRACT SUM TO DATE	\$ _____
4. TOTAL COMPLETED & STORED TO DATE	\$ _____
5. Lease Payment (1/3 of Total Lease Payments for last 3 pay applications)	\$ _____
6. Total TI Payments Earned: (Line 4 less Line 5)	\$ _____
7. Retainage:	
a. 5% of Total TI Payment	\$ _____
8. TOTAL EARNED LESS Lease Payment	
& Retainage (Line 6 less Line 7)	\$ _____
9. LESS PREVIOUS APPLICATIONS FOR PAYMENT	\$ _____
10. CURRENT PAYMENT DUE	\$ _____
11. Balance to Finish, Plus Lease Pmt & Retainage (Line 3 less Line 8)	\$ _____

The undersigned Developer certifies that to the best of the Developer's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Developer for Work for which previous Certificates for Payment were issued and payments received from the District, and that current payment shown herein is now due. We certify that the Surety for this project has been notified of the amount of this request.

DEVELOPER:

By: _____ Date: _____
[NAME, TITLE]

Notary Public: _____ My Commission Expires: _____
Name: _____

ARCHITECT'S CERTIFICATE FOR PAYMENT

RECOMMENDED FOR CERTIFICATION

By: _____ Date: _____
NAME:

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Architect certifies to the District that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Developer is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ _____

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Developer named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the District or Developer under this Contract.

California All-Purpose Certificate of Acknowledgment

A notary public or other officer completing this
certificate verifies only the identity of the
individual who signed the document to which this certificate is attached, and
not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
) ss.
COUNTY OF _____)

On _____, before me, _____, Notary Public, personally appeared _____, who
proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and
acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature on the
instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

Witness my hand and official seal.

Signature of Notary Public: _____ (Seal)

CONTINGENCY EXPENDITURE DIRECTIVE FORM

Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 953766

**CONTINGENCY
EXPENDITURE
DIRECTIVE NO.:**

CONTINGENCY EXPENDITURE DIRECTIVE

Project:
Building Project:
Bid No.:

Date:
DSA File No.:
DSA Appl. No.:

The following parties agree to the terms of this Contingency Expenditure Directive ("CED"):

Owner: Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376

Developer:

Reference	Description	Contingency Authorized for Expenditure	Days Ext.
Request for CED # Requested by: Performed by: Reason:	[Description of unforeseen item relating to Work] [Requester] [Performer] [Reason]	\$	
Request for CED # Requested by: Performed by: Reason:	[Description of unforeseen item relating to Work] [Requester] [Performer] [Reason]	\$	
Request for CED # Requested by: Performed by: Reason:	[Description of unforeseen item relating to Work] [Requester] [Performer] [Reason]	\$	

Contract time will be adjusted as follows:	Total Contract Contingency Amount:	\$
Previous Completion Date:_[DATE]_	Amount of Previously Approved Contingency Expenditure Directive(s):	\$
_____[#]_____Calendar Days Extension (zero days unless otherwise indicated)	Amount of this Contingency Expenditure Directive:	\$
Current Completion Date:_[DATE]_		

The undersigned Developer approves the foregoing release of contingency for completion of each specified item, and as to the extension of time allowed, if any, for completion of the entire work as stated therein, and agrees to furnish all labor, materials and services and perform all work necessary to complete any additional work specified for the consideration stated therein ("Work"). Submission of sums which have no basis in fact or which Developer knows are false are at the sole risk of Developer and may be a violation of the False Claims Act set forth under Government Code section 12650, et seq.

This Contingency Expenditure Directive must be signed by an authorized District representative.

It is expressly understood that the authorized contingency expenditure and time, if any, granted herein represent a full accord and satisfaction for any and all time and cost impacts of the items herein, and Developer waives any and all further compensation or time extension based on the items herein. The value of the extra work or changes expressly includes any and all of the Developer's costs and expenses, and its subcontractors, both direct and indirect, resulting from additional time required on the project or resulting from delay to the project. Any costs, expenses, damages or time extensions not included are deemed waived.

Signatures:

District:

Developer:

[Name] Date

[Name] Date

Architect:

Project Inspector:

[Name] Date

[Name] Date

END OF DOCUMENT

ALLOWANCE EXPENDITURE DIRECTIVE FORM

Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376

**ALLOWANCE
EXPENDITURE
DIRECTIVE NO.:**

ALLOWANCE EXPENDITURE DIRECTIVE

Project: Building Project
Bid No.:

Date:
DSA File No.:
DSA Appl. No.:

The following parties agree to the terms of this Allowance Expenditure Directive ("AED"):

Owner: Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376

Developer:

Reference	Description	Allowance Authorized for Expenditure	Days Ext.
Request for AED # Requested by: Performed by: Reason:	[Description of unforeseen item relating to Work] [Requester] [Performer] [Reason]	\$	
Request for AED # Requested by: Performed by: Reason:	[Description of unforeseen item relating to Work] [Requester] [Performer] [Reason]	\$	
Request for AED # Requested by: Performed by: Reason:	[Description of unforeseen item relating to Work] [Requester] [Performer] [Reason]	\$	

Contract time will be adjusted as follows: Previous Completion Date:_[DATE]_ _____[#]____Calendar Days Extension (zero days unless otherwise indicated) Current Completion Date:_[DATE]_	Total Contract Allowance Amount:	\$
	Amount of Previously Approved Allowance Expenditure Directive(s):	\$
	Amount of this Allowance Expenditure Directive:	\$

The undersigned Developer approves the foregoing release of allowance for completion of each specified item, and as to the extension of time allowed, if any, for completion of the entire work as stated therein, and agrees to furnish all labor, materials and services and perform all work necessary to complete any additional work specified for the consideration stated therein ("Work"). Submission of sums which have no basis in fact or which Developer knows are false are at the sole risk of Developer and may be a violation of the False Claims Act set forth under Government Code section 12650, et seq.

This Allowance Expenditure Directive must be signed by an authorized District representative.

It is expressly understood that the authorized allowance expenditure and time, if any, granted herein represent a full accord and satisfaction for any and all time and cost impacts of the items herein, and Developer waives any and all further compensation or time extension based on the items herein. The value of the extra work or changes expressly includes any and all of the Developer's costs and expenses, and its subcontractors, both direct and indirect, resulting from additional time required on the project or resulting from delay to the project. Any costs, expenses, damages or time extensions not included are deemed waived.

Signatures:

District:

Developer:

[Name] Date

[Name] Date

Architect:

Project Inspector:

[Name] Date

[Name] Date

END OF DOCUMENT

PROPOSED CHANGE ORDER FORM

Tracy Unified School District
1875 W. Lowell Avenue
Tracy, CA 95376

PCO NO.:

Project:
Bid No.:
RFI #:

Date:
DSA File No.:
DSA Appl. No.:

Developer hereby submits for District's review and evaluation this Proposed Change Order ("PCO"), submitted in accordance with and subject to the terms of the Contract Documents, including Sections 17.7 and 17.8 of the General Conditions. Any spaces left blank below are deemed no change to cost or time.

Developer understands and acknowledges that documentation supporting Developer's PCO must be attached and included for District review and evaluation. Developer further understands and acknowledges that failure to include documentation sufficient to, in District's discretion, support some or all of the PCO, shall result in a rejected PCO.

	<u>WORK PERFORMED OTHER THAN BY DEVELOPER</u>	<u>ADD</u>	<u>DEDUCT</u>
	<u>Material</u> (attach suppliers' invoice or itemized quantity and unit cost plus sales tax)		
	<u>Add Labor</u> (attach itemized hours and rates, fully encumbered)		
	<u>Add Equipment</u> (attach suppliers' invoice)		
	<u>Subtotal</u>		
	<u>Add overhead and profit for any and all tiers of Subcontractor</u> , the total not to exceed ten percent (10%) of Item (d)		
	<u>Subtotal</u>		
	<u>Add Overhead and Profit for Developer</u> , not to exceed five percent (5%) of Item (f)		
	<u>Subtotal</u>		
	<u>Add Bond and Insurance</u> , not to exceed three-quarter percent (.75%) of Item (h)		
	<u>TOTAL</u>		
	<u>Time</u> (zero unless indicated; "TBD" not permitted)	<u>___ Calendar Days</u>	

[REMAINDER OF PAGE LEFT BLANK INTENTIONALLY]

	<u>WORK PERFORMED BY DEVELOPER</u>	<u>ADD</u>	<u>DEDUCT</u>
(a)	<u>Material</u> (attach itemized quantity and unit cost plus sales tax)		
	<u>Add Labor</u> (attach itemized hours and rates, fully encumbered)		
	<u>Add Equipment</u> (attach suppliers' invoice)		
	<u>Subtotal</u>		
	<u>Add Overhead and Profit for Developer</u> , not to exceed fifteen percent (15%) of Item (d)		
	<u>Subtotal</u>		
	<u>Add Bond and Insurance</u> , not to exceed three-quarter percent (.75%) of Item (f)		
	<u>TOTAL</u>		
	<u>Time</u> (zero unless indicated; "TBD" not permitted)	<u> Calendar Days</u>	

The undersigned Developer approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for completion of the entire Work as stated herein, and agrees to furnish all labor, materials, and service, and perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of sums which have no basis in fact or which Developer knows are false are at the sole risk of Developer and may be a violation of the False Claims Act set forth under Government Code section 12650 *et seq.* It is understood that the changes herein to the Contract shall only be effective when approved by the governing board of the District.

It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Developer's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project. Developer is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

SUBMITTED BY:

Developer:

_____ Date

END OF DOCUMENT

GUARANTEE FORM

_____ ("Contractor") hereby agrees that the _____
("Work" of Contractor) which Contractor has installed for the Tracy Unified School District
("District") for the following project:

WEST HIGH SCHOOL AG ADDITION Project PTN#75499-199

("Project" or "Contract") has been performed in accordance with the requirements of the
Contract Documents and that the Work as installed will fulfill the requirements of the
Contract Documents.

The undersigned agrees to repair or replace any or all of such Work that may prove to be
defective in workmanship or material together with any other adjacent Work that may be
displaced in connection with such replacement within a period of two (2) year(s) from the
date of completion as defined in Public Contract Code section 7107, subdivision (c), ordinary
wear and tear and unusual abuse or neglect excepted. The date of completion is
_____, 20____.

In the event of the undersigned's failure to comply with the above-mentioned conditions
within a reasonable period of time, as determined by the District, but not later than seven
(7) days after being notified in writing by the District, the undersigned authorizes the
District to proceed to have said defects repaired and made good at the expense of the
undersigned. The undersigned shall pay the costs and charges therefor upon demand.

Date: _____

Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

Representatives to be contacted for service subject to terms of Contract:

Name: _____

Address: _____

Phone NO.: _____

END OF DOCUMENT

AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS

THIS AGREEMENT AND RELEASE OF CLAIMS ("Agreement and Release") IS MADE AND ENTERED INTO THIS _____ DAY OF _____, 20____ by and between the Tracy Unified School District ("District") and _____ ("Developer"), whose place of business is _____.

RECITALS:

WHEREAS, District and Developer entered into a Facilities Lease and Site Lease for the following project: **WEST HIGH SCHOOL AG ADDITION Project PTN#75499-199** ("Contract" or "Project") in the County of San Joaquin, California.

WHEREAS, The Work under the Contract was completed on _____, 20____ and a Notice of Completion was recorded with the County Recorder on _____, 20____.

NOW, THEREFORE, it is mutually agreed between District and Developer as follows:

AGREEMENT

1. Developer will only be assessed liquidated damages as detailed below:

Original Guaranteed Maximum Price	\$_	Modified Guaranteed Maximum Price	
\$ _____	Payment	to	Date
		\$ _____	
Liquidated Damages	\$ _____		
Payment Due Developer	\$ _____		

2. Subject to the provisions hereof, District shall forthwith pay to Developer the undisputed sum of _____ Dollars (\$ _____) under the Contract for Tenant Improvement Payments, less any amounts represented by any notice to withhold funds on file with District as of the date of such payment.
3. Developer acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against District arising from the performance of work under the Contract, except for the claims described in Paragraph 4 and continuing obligations described in Paragraph 6. It is the intention of the parties in executing this Agreement and Release that this Agreement and Release shall be effective as a full, final and general release of all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities of Developer against District and all of its respective agents, employees, trustees, inspectors, assignees, consultants and transferees, except for the Lease Payments under the Contract, any Disputed Claim that may be set forth in Paragraph 4 and the continuing obligations described in Paragraph 6 hereof.

4. The following claims are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release:

<u>Claim No.</u>	<u>Description of Claim</u>	<u>Amount of Claim</u>	<u>Date Claim Submitted</u>
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____

[If further space is required, attach additional sheets showing the required information.]

5. Consistent with California Public Contract Code section 7100, Developer hereby agrees that, in consideration of the payment set forth in Paragraph 2 hereof, Developer hereby releases and forever discharges District, all its agents, employees, inspectors, assignees, and transferees from any and all liability, claims, demands, actions, or causes of action of whatever kind or nature arising out of or in any way concerned with the Work under the Contract, except for the Lease Payments.
6. Guarantees and warranties for the Work, duty to defend, indemnify and hold harmless the District, and any other continuing obligation of Developer, shall remain in full force and effect as specified in the Contract Documents.
7. Except as provided for specifically herein, Developer hereby waives the provisions of California Civil Code section 1542 which provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.

8. The provisions of this Agreement and Release are contractual in nature and not mere recitals and shall be considered independent and severable. If any such provision or any part thereof shall be at any time held invalid in whole or in part under any federal, state, county, municipal, or other law, ruling, or regulations, then such provision, or part thereof, shall remain in force and effect to the extent permitted by law, and the remaining provisions of this Agreement and Release shall also remain in full force and effect, and shall be enforceable.
9. All rights of District shall survive completion of the Work or termination of Contract, and execution of this Release.

* * * CAUTION: THIS IS A RELEASE - READ BEFORE EXECUTING * * *

TRACY UNIFIED SCHOOL DISTRICT

Signature: _____

Print Name: _____

Title: _____

DEVELOPER:

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
DSA SUBMITTAL
11 OCTOBER 2024

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Contractor's use of site and premises.
 2. Coordination with occupants.
 3. Work restrictions.
 4. Specification and Drawing conventions.

1.02 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Driveways, Walkways, and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
- C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.03 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

HMC Architects
3595002100

SUMMARY
01 10 00 - 1

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
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1.04 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours, Monday through Friday, unless otherwise indicated.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Architect not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.

1.05 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

TRACY UNIFIED SCHOOL DISTRICT
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- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SUMMARY
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TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
DSA SUBMITTAL
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SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.

1.02 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.03 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.

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SUBSTITUTION PROCEDURES
01 25 00 - 1

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
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- i. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.04 QUALITY ASSURANCE

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

1.05 PROCEDURES

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

1.06 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

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SUBSTITUTION PROCEDURES
01 25 00 - 2

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
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- b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
- 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
DSA SUBMITTAL
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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SUBSTITUTION PROCEDURES
01 25 00 - 4

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
DSA SUBMITTAL
11 OCTOBER 2024

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections:
 - 1. Section 01 26 73 "DSA Construction Change Document Procedures" for contract modifications of portions of the project affecting the Structural Safety, Access Compliance, and Fire and Life Safety.

1.02 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1.03 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.

HMC Architects

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CONTRACT MODIFICATION
PROCEDURES
01 26 00 - 1

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
DSA SUBMITTAL
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- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use form acceptable to Architect.

1.04 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor..

1.05 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive directing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

HMC Architects

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CONTRACT MODIFICATION
PROCEDURES
01 26 00 - 2

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
DSA SUBMITTAL
11 OCTOBER 2024

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

HMC Architects

3595002100

CONTRACT MODIFICATION
PROCEDURES
01 26 00 - 3

TRACY UNIFIED SCHOOL DISTRICT
MERRILL F WEST HS AGRICULTURE CTE BLDG - INCREMENT 2
DSA SUBMITTAL
11 OCTOBER 2024

SECTION 01 26 73 – DSA CONSTRUCTION CHANGE DOCUMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing DSA Construction Change Documents for modifications of portions of the project affecting the Structural Safety, Access Compliance, and Fire and Life Safety.
- B. Related Sections:
 - 1. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling contract modifications not affecting the Structural Safety, Access Compliance, and Fire and Life Safety portions of the project.

1.02 DEFINITIONS

- A. DSA: Division of the State Architect.

1.03 CONSTRUCTION CHANGE DOCUMENT

- A. Construction Change Document: Architect will submit a Construction Change Document on DSA Form 140 Application for Approval of Construction Change Document to DSA. Upon DSA approval of a Construction Change Document, Architect will notify Contractor to proceed with the change in the Work, for subsequent inclusion in a Change Order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Arrange schedule of values consistent with format of AIA Document G703.
 - 2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - 3. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 - 4. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
 - 5. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.03 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

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- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use form designated by Architect as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien in accordance with Owner's requirements and as follows:
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Sustainable design action plans, including preliminary project materials cost data.
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).

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8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706.
 5. AIA Document G706A.
 6. AIA Document G707.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Project meetings.

1.02 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.

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1.03 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.04 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Owner name.
 2. Owner's Project number.
 3. Name of Architect.
 4. Architect's Project number.
 5. Date.
 6. Name of Contractor.
 7. RFI number, numbered sequentially.
 8. RFI subject.
 9. Specification Section number and title and related paragraphs, as appropriate.
 10. Drawing number and detail references, as appropriate.
 11. Field dimensions and conditions, as appropriate.
 12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 13. Contractor's signature.

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14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
 - D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within five days of receipt of the RFI response.
 - E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three days if Contractor disagrees with response.
- 1.05 PROJECT MEETINGS
- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
 1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

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2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Critical work sequencing and long lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Sustainable design requirements.
 - l. Preparation of Record Documents.
 - m. Use of the premises.
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for moisture and mold control.
 - s. Procedures for disruptions and shutdowns.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.
 - w. Equipment deliveries and priorities.
 - x. First aid.
 - y. Security.
 - z. Progress cleaning.
 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

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5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at regular intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Status of sustainable design documentation.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site use.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.
 - 15) Status of Proposal Requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) Documentation of information for payment requests.
 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.

1.02 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file.
 - 2. PDF file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.

1.03 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

1.04 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
 - a. Securing of approvals and permits required for performance of the Work.

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- b. Temporary facilities.
 - c. Construction of mock-ups, prototypes and samples.
 - d. Owner interfaces and furnishing of items.
 - e. Interfaces with Separate Contracts.
 - f. Regulatory agency approvals.
 - g. Punch list.
 - 3. Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.
- C. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- D. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
- 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Final Completion percentage for each activity.
- E. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
- 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
- 1.05 GANTT-CHART SCHEDULE REQUIREMENTS
- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for commencement of the Work.

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1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Submittal schedule requirements.
 2. Administrative and procedural requirements for submittals.

1.02 DEFINITIONS

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

1.03 SUBMITTAL SCHEDULE

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

1.04 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Contractor.
 5. Name of firm or entity that prepared submittal.
 6. Names of subcontractor, manufacturer, and supplier.
 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.

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11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.05 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

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1.06 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

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- a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
- a. Number of Samples: Submit full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
- a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; remainder will be returned. Retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

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- E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- F. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- G. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

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5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.07 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.08 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

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1.09 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review or discard submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned or discarded by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.02 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.

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2. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall have the same meaning as testing agency.
- I. 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.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.
- 1.03 DELEGATED-DESIGN SERVICES
- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Statement: Submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

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1.04 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.05 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.06 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.

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6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Statement on condition of substrates and their acceptability for installation of product.
 2. Statement that products at Project site comply with requirements.
 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Statement that equipment complies with requirements.
 2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 3. Other required items indicated in individual Specification Sections.
- 1.07 QUALITY ASSURANCE
- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products 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.

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- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, 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.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection 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.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - d. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of size indicated.
 - 2. Build mockups in location indicated or, if not indicated, as directed by Architect.

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3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

1.08 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 1. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

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- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Contractor-Engaged Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 6. Security and protection for samples and for testing and inspection equipment at Project site.

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- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.09 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

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SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.01 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": 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.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.02 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

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1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.

- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.03 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.02 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.

1.03 INFORMATIONAL SUBMITTALS

- A. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- C. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.

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- 4. Waste-handling procedures.
- 5. Other dust-control measures.

1.04 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and the California Building Code.

1.05 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

3.02 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.

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1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - B. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - C. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - D. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- 3.03 SUPPORT FACILITIES INSTALLATION
- A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
 - B. Parking: Provide temporary offsite or use designated areas of Owner's existing parking areas, if authorized, for construction personnel.
 - C. Storage and Staging: Provide temporary offsite area or use designated areas of Project site for storage and staging needs.
 - D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
 - E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 3. Maintain and touch up signs, so they are legible at all times.

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- F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.
1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 4. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- G. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.

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- H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.05 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.

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6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.06 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- B. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END OF SECTION

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SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling and comparable products.

1.02 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

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- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 "Submittal Procedures."
- F. Substitution: Refer to Section 01 25 00 "Substitution Procedures" for definition and limitations on substitutions.

1.03 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

1.05 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.

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2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.
- B. Product Selection Procedures:
 1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."

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2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.

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- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.
 - 1. Select products for which sustainable design documentation submittals are available from manufacturer.

2.02 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
 - 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 01 33 00 "Submittal Procedures."
 - 1. Form of Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."

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2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
 - 1. Installation of the Work.
 - 2. Progress cleaning.
 - 3. Starting and adjusting.
 - 4. Protection of installed construction.

PART 2 - PRODUCTS

2.01 MATERIALS

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

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

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- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.03 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.04 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb, and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

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- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.

3.05 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

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3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 - B. Site: Maintain Project site free of waste materials and debris.
 - C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
 - D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
 - E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
 - F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
 - G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
 - H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
 - I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
 - J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- 3.06 STARTING AND ADJUSTING
- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
 - B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

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- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.07 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

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SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
 - 1. Cutting and patching.

1.02 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.03 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
 - 1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.
 - c. Trade supervisor(s) responsible for patching of each type of substrate.
 - d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.
 - e. HVAC shutdown and sealing of air intakes.
 - 2. Coordinate work activities with Owner so Owner has adequate advance notice to place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
 - 3. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.04 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

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2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.05 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Comply with requirements specified in other Sections.

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- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Fluid-Applied Flashing and Roofing Membrane: Flexible, PMMA-based resin combined with a thixotropic agent for use in combination with non-woven, needle-punched polyester fabric reinforcement to form a monolithic, reinforced flashing and roofing membrane.
 - 1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - a. Kemper System; Kemperol AC Speed FR.
 - b. Siplast; Parapro.
 - c. Soprema; Alsan RS.

PART 3 - EXECUTION

3.01 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 01 10 00 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

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- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

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5. Roofing Membrane Assemblies: Patch roofing membrane penetrations and transitions with reinforced, liquid applied PMMA flashing membrane. Embed roofing granules to match existing roofing granule cap and flashing sheets.
6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

END OF SECTION

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SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.

1.02 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.03 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

1.04 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

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4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 5. Submit testing, adjusting, and balancing records.
 6. Submit sustainable design submittals not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
- 1.05 FINAL COMPLETION PROCEDURES
- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Division 01 Section payment procedures."

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

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

1.06 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the following format:
 - a. PDF Electronic File: Architect will return annotated file.

1.07 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

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PART 2 - PRODUCTS

2.01 MATERIALS

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

PART 3 - EXECUTION

3.01 FINAL CLEANING

- A. Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - c. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - d. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - e. Vacuum and mop concrete.
 - f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - h. Remove labels that are not permanent.
 - i. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

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- j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
- m. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
- n. Clean strainers.
- o. Leave Project clean and ready for occupancy.

END OF SECTION

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SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Systems and equipment operation manuals.
 - 2. Systems and equipment maintenance manuals.
 - 3. Product maintenance manuals.

1.02 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
- C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training.

1.03 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

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1.04 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.

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7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.05 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

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- a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of maintenance manuals.

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1.06 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 78 36 - WARRANTIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for warranties on products and systems.
- B. Related Sections:
 - 1. Section 01 77 00 "Closeout Procedures" for submitting warranties.

1.02 WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product, system, and installation warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product or system and issued in the name of the Owner or endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner for a particular product or system and issued in the name of the Owner or endorsed by manufacturer to Owner.
 - a. Installation Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner for a particular product or system and issued in the name of the Owner or endorsed by installer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record specifications.

1.02 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up record prints.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Contract modifications.

1.03 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.

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- j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
- 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file.
 - 3. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

1.04 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
- 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Note related Change Orders and Record Drawings where applicable.
- B. Format: Submit record specifications as annotated PDF electronic file .

1.05 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 81 13.71 - SUSTAINABLE DESIGN REQUIREMENTS - CALGREEN
NON-RESIDENTIAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: General requirements and procedures for compliance with 24 CCR 11, California Green Building Standards Code (CALGreen).
 - 1. Some CALGreen requirements depend on product selections and may not be specifically identified as CALGreen requirements. Compliance with CALGreen requirements may be used as one criterion to evaluate substitution requests and comparable product requests.
 - 2. Some CALGreen requirements depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.
 - 3. Additional CALGreen requirements not included in this specification apply to the Project.

1.02 DEFINITIONS

- A. CALGreen: California Green Building Standards Code, including supplements in effect as of date of the Contract Documents unless otherwise indicated.
 - 1. Definitions that are part of CALGreen apply to this Section.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Respond to questions and requests from Architect about CALGreen requirements that depend on product selection or product qualities. Document responses as informational submittals.
- B. When requested by enforcing agency submit substantiating documentation confirming compliance with CALGreen requirements.
- C. Sustainable design submittals shall be identified and submitted separately from other submittals.

1.04 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for Construction Waste Management: Submit documentation complying with CALGreen for one of the following:
 - a. Construction Waste Management Plan.
 - b. Waste Management Company.
 - c. Waste Stream Reduction Alternative.

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PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Construction Waste Management: Achieve end-of-Project rates for salvage/recycling of not less than 65 percent of total nonhazardous solid waste generated by the Work. Comply with local construction and demolition waste management ordinance when it is more stringent.
- B. Universal Waste: Universal Waste items such as fluorescent lamps and ballast, and mercury containing thermostats, as well as other California prohibited Universal Waste materials shall be disposed of properly and diverted from landfills.
- C. Site-Clearing Waste: 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. If contamination by disease or pest infestation is suspected, contact the Country Agricultural Commissioner and follow its direction for recycling or disposal of the material.

2.02 MATERIALS

- A. Provide products and procedures necessary to comply with CALGreen requirements in this Section. Although other Sections may specify some requirements that contribute to referenced CALGreen requirements, determine additional materials and procedures necessary to comply with CALGreen requirements indicated.

2.03 LOW-EMITTING MATERIALS

- A. Adhesives and Sealants:
 - 1. For field applications, adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, and caulks shall comply with VOC content limits of authorities having jurisdiction, or the following VOC content limits:
 - a. Indoor Carpet Adhesives: 50 g/L.
 - b. Carpet Pad Adhesives: 50 g/L.
 - c. Outdoor Carpet Adhesives: 150 g/L.
 - d. Wood Flooring Adhesive: 100 g/L.
 - e. Rubber Floor Adhesives: 60 g/L.
 - f. Subfloor Adhesives: 50 g/L.
 - g. Ceramic Tile Adhesives: 65 g/L.
 - h. VCT and Asphalt Tile Adhesives: 50 g/L.
 - i. Gypsum Board and Panel Adhesives: 50 g/L.
 - j. Cove Base Adhesives: 50 g/L.
 - k. Multipurpose Construction Adhesives: 70 g/L.
 - l. Structural Glazing Adhesives: 100 g/L.

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- m. Single-Ply Roof Membrane Adhesive: 250 g/L.
- n. Other Adhesive Not Specifically Listed: 50 g/L.
- o. PVC Welding Compounds: 510 g/L.
- p. CPVC Welding Compounds: 490 g/L.
- q. ABS Welding Compounds: 325 g/L.
- r. Plastic Cement Welding Compounds: 250 g/L.
- s. Adhesive Primer for Plastic: 550 g/L.
- t. Contact Adhesive: 80 g/L.
- u. Special-Purpose Contact Adhesive (Contact Adhesive That Is Used to Bond Melamine Covered Board, Metal, Unsupported Vinyl, Rubber, or Wood Veneer 1/16 Inch or Less in Thickness to Any Surface): 250 g/L.
- v. Structural Wood Member Adhesives: 140 g/L.
- w. Top and Trim Adhesive: 250 g/L.
- x. Metal-to-Metal Adhesives: 30 g/L.
- y. Plastic Foam Adhesives: 50 g/L.
- z. Adhesives for Porous Materials (except Wood): 50 g/L.
- aa. Wood Glues: 30 g/L.
- bb. Fiberglass Adhesives: 80 g/L.
- cc. Architectural Sealants: 250 g/L.
- dd. Nonmembrane Roof Sealants: 300 g/L.
- ee. Roadway Sealants: 250 g/L.
- ff. Single-Ply Roof Membrane Sealants: 450 g/L.
- gg. Other Sealants: 420 g/L.
- hh. Sealant Primers for Nonporous Substrates: 250 g/L.
- ii. Sealant Primers for Porous Substrates: 775 g/L.
- jj. Modified Bituminous Sealant Primers: 500 g/L.
- kk. Other Sealant Primers: 750 g/L.
- 2. Prohibited Ingredients: Adhesives and sealants must not contain the following:
 - a. Chloroform.
 - b. Ethylene dichloride.
 - c. Methylene chloride.
 - d. Perchloroethylene.
 - e. Trichloroethylene.
- 3. Additional Requirements: Comply with additional requirements in CALGreen for aerosol adhesives, and small unit sizes of adhesives, and sealant or caulking compounds.

B. Paints and Coatings:

- 1. For field applications, paints and coatings shall comply with VOC limits of California Air Resources Board (CARB) Architectural Coatings Suggested Control Measure (SCM) below, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed shall be determined by classifying the coating as flat, nonflat, or nonflat-high gloss coating, based on its gloss.
 - a. Flat Coatings: 50 g/L.

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- b. Nonflat Coatings: 100 g/L.
- c. Nonflat - High Gloss Coatings: 150 g/L.
- d. Specialty Coatings:
 - 1) Aluminum Roof Coatings: 400 g/L.
 - 2) Basement Special Coatings: 400 g/L.
 - 3) Bituminous Roof Coatings: 50 g/L.
 - 4) Bituminous Roof Primers: 350 g/L.
 - 5) Bond Breakers: 350 g/L.
 - 6) Concrete Curing Compounds: 350 g/L.
 - 7) Concrete/Masonry Sealers: 100 g/L.
 - 8) Driveway Sealers: 50 g/L.
 - 9) Dry-Fog Coatings: 150 g/L.
 - 10) Faux Finishing Coatings: 350 g/L.
 - 11) Fire-Resistive Coatings: 350 g/L.
 - 12) Floor Coatings: 100 g/L.
 - 13) Form-Release Compounds: 250 g/L.
 - 14) Graphic Arts Coatings (Sign Paints): 500 g/L.
 - 15) High-Temperature Coatings: 420 g/L.
 - 16) Industrial Maintenance Coatings: 250 g/L.
 - 17) Low Solids Coatings: 120 g/L.
 - 18) Magnesite Cement Coatings: 450 g/L.
 - 19) Mastic Texture Coatings: 100 g/L.
 - 20) Metallic Pigmented Coatings: 500 g/L.
 - 21) Multi-Color Coatings: 250 g/L.
 - 22) Pretreatment Wash Primers: 420 g/L.
 - 23) Primers, Sealers, and Undercoaters: 100 g/L.
 - 24) Reactive Penetrating Sealers: 350 g/L.
 - 25) Recycled Coatings: 250 g/L.
 - 26) Roof Coatings: 50 g/L.
 - 27) Rust-Preventive Coatings: 250 g/L.
 - 28) Shellacs, Clear: 730 g/L.
 - 29) Shellacs, Opaque: 550 g/L.
 - 30) Specialty Primers, Sealers and Undercoaters: 100 g/L.
 - 31) Stains: 250 g/L.
 - 32) Stone Consolidants: 450 g/L.
 - 33) Swimming Pool Coatings: 340 g/L.
 - 34) Traffic Marking Coatings: 100 g/L.
 - 35) Tub and Tile Refinish Coatings: 420 g/L.
 - 36) Waterproof Membranes: 250 g/L.
 - 37) Wood Coatings: 275 g/L.
 - 38) Wood Preservatives: 350 g/L.
 - 39) Zinc-Rich Primers: 340 g/L.
- 2. Additional Requirements: Comply with additional requirements in CALGreen for aerosol paints and coatings.

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- C. Carpet Systems: All interior carpet materials, including cushion, shall comply with at least one of the following:
 - 1. Carpet and Rug Institute's Green Label Plus program.
 - 2. VOC-emission limits and testing requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2 (CDPH Standard Method v1.2).
- D. Composite Wood Products: Composite wood products used on the interior or exterior of the building shall have formaldehyde emission rates not greater than the following specified by the California Air Resources Board (CARB), Air Toxics Control Measure (ATCM) for Composite Wood, as tested in accordance with ASTM E1333:
 - 1. Hardwood Plywood (Veneer Core and Composite Core): 0.05 ppm.
 - 2. Particleboard: 0.09 ppm.
 - 3. Medium-Density Fiberboard More Than 5/16 Inch Thick: 0.11 ppm.
 - 4. Medium-Density Fiberboard 5/16 Inch or Less in Thickness: 0.13 ppm.
- E. Resilient Flooring Systems: Where resilient flooring is installed, at least 80 percent of floor area receiving resilient flooring shall meet the requirements comply with the following:
 - 1. VOC-emission limits and testing requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2 (CDPH Standard Method v1.2).
- F. Thermal Insulation: Thermal insulation products shall comply with VOC-emission limits and testing requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2 (CDPH Standard Method v1.2).
- G. Acoustical Ceilings and Wall Panels: Acoustical ceilings and wall panels shall comply with VOC-emission limits and testing requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2 (CDPH Standard Method v1.2).

PART 3 - EXECUTION

3.01 CONSTRUCTION WASTE MANAGEMENT

- A. Construction Waste Management: Achieve specified rates for waste management by one of the following:

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1. Construction Waste Management Plan: Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that includes the following:
 - a. Identification of construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the Project or salvage for future use or sale.
 - b. Determination of construction and demolition waste materials will be sorted on-site (source separated) or bulk mixed (single stream).
 - c. Identification of diversion facilities where construction and demolition waste material collected will be taken.
 - d. Specification of the amount of construction and demolition waste materials diverted shall be taken by weight or volume, but not by both.
2. Waste Management Company: Utilize a waste management company that can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with CALGreen.
3. Waste Stream Reduction Alternative: The combined weight of new construction disposal that does not exceed two pounds per square foot of building area shall be deemed to meet the 65 percent minimum requirement as approved by the enforcing agency.

3.02 CONSTRUCTION IAQ MANAGEMENT

- A. Cover or close openings in ducts and other related air-distribution component openings with tape, plastic, sheet metal, or other approved method before beginning dust-producing operations and maintain until dust-producing operations are complete.
- B. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period, install MERV 8 filter media according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
 1. Replace all air filters immediately prior to occupancy.

END OF SECTION

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SECTION 03 10 00 - CONCRETE FORMWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in place concrete with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.
- E. Related Sections:
 - 1. Section 03 20 00, Concrete Reinforcement.
 - 2. Section 03 30 00, Cast-In Place Concrete.

1.02 REFERENCE STANDARDS

- A. Conform to current adopted reference standards as listed in Chapter 35 the 2022 California Building Code.
- B. ACI 117 - Standard Tolerances for Concrete Construction and Materials.
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- D. PS-1 - Construction and Industrial Plywood.
- E. California Code of Regulations, Title 8 Subchapter 4. Construction Safety Orders, Article 29, Erection and Construction, Section 1717.
- F. Chapter 19A, 2022 California Building Code.
- G. APA - American Plywood Association Design and Construction Guide.
- H. CCR - California Code of Regulations, Title 8, Subchapter 4, Construction Safety Orders.
- I. Local AQMD - Air Quality Management District.

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1.03 COORDINATION

- A. Coordinate this Section with other Sections of work that require attachment of components to formwork.
- B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

PART 2 - PRODUCTS

2.01 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to conform to Section 26.11, ACI 318. Resultant concrete to conform to required shape, line and dimension. Design of formwork is Contractor's responsibility.
- B. The formwork shall be designed for the loads and lateral pressures outlined in Chapter 2 of ACI 347R, and lateral forces as specified by the CBC.
- C. Forms shall be designed by a professional Structural engineer registered in the State of California.
- D. Foundation concrete may be placed directly into neat excavations, provided foundation trench walls are stable as determined by Architect, subject to approval of DSA and Architect. In such case, minimum formwork indicated on drawings is mandatory to insure clean excavations immediately prior to and during placing of concrete.

2.02 FORM MATERIALS

- A. Plywood: APA - MDO (Medium Density Overlay) Plyform, Group 1, Exterior, PS-1, for exposed surfaces. APA - BB (No-overlay) Plyform, Class 1, Exterior, PS-1 for unexposed surfaces.
- B. Lumber: Douglas Fir species; construction grade with grade stamp clearly visible.
- C. Form Ties: Removable metal of adjustable length, cone ends.

2.03 FORMWORK ACCESSORIES

- A. Form Release Agent: Colorless non-staining liquid chemical agent, free of wax or oils which will not absorb water. Material shall comply with Local AQMD.
- B. Corners: Chamfered type; maximum possible lengths.

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- C. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.

3.02 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements in accordance with requirements of ACI 318 Section 26.11.
 - 1. Calculations Required: Provide shoring required to protect all earth banks which cannot be sloped back, due to adjacent structures, walks, streets or property lines. Provide engineering calculations and drawings necessary to perform Work. Calculations to be sealed and signed by licensed California Structural Engineer.
 - 2. Where public areas such as sidewalks and streets are to be shored, drawings and calculations are to be submitted by Contractor to the city or governing agency for approval prior to beginning of any work.
 - 3. Contractor and/or his engineer assume and accept all responsibility for construction and safety of shoring.
 - 4. Upon completion of Work, shoring materials are to be removed from site at expense of Contractor. Certain steel and/or concrete materials may be left in place with written approval of Architect.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shoring. Conform to Title 8, Subchapter 4, Construction Safety Orders, CCR.
- D. Align joints and make watertight. Keep form joints to a minimum.

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- E. Obtain approval before framing openings in structural members that are not indicated on Drawings.
- F. Provide chamfer strips on external corners.
- G. Surface irregularities, ACI 347R Class A, gradual or abrupt irregularities of 1/8 inch for exposed to view concrete. Class B, 1/4 inch for plaster cement finish.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work. No openings or embedded items permitted in structural slabs within 18 inches of columns. Conform to Section ACI 318 Section 26.11.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors and other inserts, whether indicated on the structural drawings or not.
- D. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement.

3.06 FORM CLEANING

- A. Clean and remove foreign matter within forms as erection proceeds.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

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3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117.

3.08 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design and that supports, fastenings, wedges, ties and items are secure.

3.09 FORM REMOVAL

- A. Conform to Chapter 26, Section 26.11, ACI 318.
- B. Loosen forms carefully. Do not wedge pry bars, hammers or tools against finish concrete surfaces scheduled for exposure to view. Do not break-off corners.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms. Re-shoring permitted only after 10 days and prior to stripping.

END OF SECTION

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SECTION 03 15 00 - CONCRETE ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Waterstops.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.01 WATERSTOPS

- A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete (19 by 25 mm).
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP.
 - b. CETCO; Volclay Waterstop-RX.
 - c. Concrete Sealants Inc.; Conseal CS-231.
 - d. Greenstreak; Swellstop.
 - e. Henry Company, Sealants Division; Hydro-Flex.
 - f. JP Specialties, Inc.; Earth Shield Type 20.
 - 2. Locations: For joints in 8-inch or greater concrete with a minimum concrete coverage of 3 inches and subject to a hydrostatic head no greater than 200 feet.
- B. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic rubber, for adhesive bonding to concrete.
 - 1. Product: Adeka; KBA-1510FP.
 - 2. Locations: For joints in 4-inch or greater concrete with a minimum concrete coverage of 1 inch and subject to a hydrostatic head no greater than 25 feet.

PART 3 - EXECUTION

3.01 WATERSTOPS

- A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

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SECTION 03 20 00 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Fabricating and setting reinforcing steel and accessories for cast-in-place concrete.
- B. Related Sections:
 - 1. Section 03 10 00, Concrete Formwork.
 - 2. Section 03 30 00, Cast-in-Place Concrete.

1.02 REFERENCE STANDARDS

- A. Conform to current adopted reference standards by date of issue of the current code cycle and the date of the Contract Documents.
- B. ACI 315 - Details and Detailing of Concrete Reinforcing.
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- D. ASTM International:
 - 1. ASTM 1064 - Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - 2. ASTM A615 - Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
- E. CRSI - Concrete Reinforcing Steel Institute Manual of Practice.
- F. Chapter 19A, 2022 California Building Code.

1.03 SUBMITTALS

- A. Shop Drawings, indicating bar sizes, spacings, locations and quantities of reinforcing steel bending and cutting schedules and supporting and spacing devices.

1.04 QUALITY ASSURANCE

- A. Provide Testing Laboratory with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.

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- B. Comply with the requirements of Division 01, General Requirements.

1.05 COORDINATION

- A. Coordinate with placement of formwork, formed openings and other Work.

PART 2 - PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, deformed billet steel bars, in grades as follows, and conforming to CBC 19A, Section 1903A.
 - 1. For No.4 and larger bars, use 60 ksi yield grade.
 - 2. For ties and stirrups, and No. 3 and smaller bars, use 40 ksi yield grade.

2.02 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16-gauge black annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.
- D. Concrete Blocks: Approximately 3 inches dimension each side.

2.03 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice, ACI 315 and ACI 318. Wherever possible, make bends to shape in fabricator's shop.
 - 1. Bars reduced in section will not be accepted.
 - 2. Bars with kinks are unacceptable.
 - 3. Bars shall not be heated to facilitate bending or for any other purpose.
 - 4. Bars with bends not indicated on drawings will not be accepted. Perform no forming in a manner which will damage bars.
 - 5. Rebending of bars prohibited.
- B. Locate reinforcing splices not indicated on Drawings at point of minimum stress.

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PART 3 - EXECUTION

3.01 PLACEMENT

- A. General: Comply with CBC and CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Place, support and secure reinforcement against displacement. Do not deviate from required position. Install concrete blocks to support reinforcement over grade. Rocks not permitted.
- C. Do not displace or damage vapor barrier where vapor barrier is specified or indicated on drawings. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- D. Accommodate placement of formed openings.
- E. Prior to placing, thoroughly clean reinforcement of all rust, dirt, dust, oil or any other material deleterious to bonding of concrete.
- F. Accurately place and securely tie reinforcement with black annealed wire and securely hold in position during placing of concrete by means of precast concrete block supports. Point wire tie ends away from the form. Unless otherwise indicated, the number, type, and spacing of supports shall conform to the ACI 315.
 - 1. Tie reinforcement splices and intersections per CBC and CRSI, Chapter 10, General Principles for Placing, Splicing and Tying Reinforcing Bars.
- G. During placing of structural concrete slabs, provide a full-time reinforcing steel placer to repair and replace reinforcing to its proper location. Provide additional chairs of the

proper size available to place under bars displaced during the concrete pouring operation.
- H. Dowels for Walls: Securely tie in place prior to placing of concrete. Do not place dowels in concrete after pour.
- I. Conform to Section 20.6.1.3.1, ACI 318, California Building Code for concrete cover over reinforcement.

END OF SECTION

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SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Cast-in-place concrete.
- B. Concrete curbs for walls, floors and slabs on grade, footings.
- C. Control, expansion and contraction joint devices associated with concrete work including joint sealants.
- D. Concrete for curbs, gutter, sidewalks, stairs and ramps and other site-related concrete is specified in Section 32 13 13.
- E. Related Sections:
 - 1. Section 03 10 00, Concrete Formwork.
 - 2. Section 03 20 00, Concrete Reinforcement.
 - 3. Section 07 92 00, Joint Sealants.
 - 4. Section 32 13 13, Sitework Concrete.

1.02 REFERENCE STANDARDS

- A. Conform to current adopted reference standards by date of issue of the current code cycle and the date of Contract Documents.
- B. CBC - 2022 California Building Code
 - 1. CBC Chapter 19A, Concrete
- C. ADA - Americans with Disabilities Act of 1990, as amended
 - 1. ADA Standards - ADA Title [II] [III] Regulations and the 2010 ADA Standards for Accessible Design.
- D. American Concrete Institute:
 - 1. ACI 224R - Control of Cracking in Concrete Structures.
 - 2. ACI 224.3R - Joints in Concrete.
 - 3. ACI 301 - Structural Concrete for Buildings.
 - 4. ACI 318 - Building Code Requirements for Structural Concrete and Commentary

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- E. ASTM International:
1. ASTM C33 - Concrete Aggregate.
 2. ASTM C150 - Portland Cement.
 3. ASTM C171 - Sheet Materials for Curing Concrete.
 4. ASTM C330 - Lightweight Aggregates for Structural Concrete.
 5. ASTM C 311 - Standard Methods of Sampling and Testing Fly Ash and Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete.
 6. ASTM C618 - Coal Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Concrete.
 7. ASTM C856 - Petrographic Examination of Hardened Concrete.
 8. ASTM C1107 - Packaged Dry, Hydraulic - Cement Grout (Nonshrink).
 9. ASTM E1155 - Standard Test Method for Determining Floor Flatness and Levelness using the F-Number System.
 10. ASTM C567 - Unit Weight of Structural Lightweight Concrete.
 11. ASTM C1116 - Specification for Fiber-Reinforced Concrete.
 12. ASTM D1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Bituminous Type).
 13. ASTM E96 - Water Vapor Transmission of Materials.
 14. ASTM F1869 - Test Method for Measuring Moisture Vapor Emission.
 15. ASTM F2170 - Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes.
- F. DSA IR 19-3 Interpretation of Regulations, Fly Ash and Natural Pozzolans Used in Concrete.
- G. CSS - Caltrans Standard Specifications, Latest Edition.

1.03 SUBMITTALS

- A. Placement Schedule: Submit for approval details and/or sketches showing location of each proposed construction joint. Do not deviate from locations of horizontal joints indicated on drawings.
- B. Product data for each type of manufactured material and product included.
- C. Design mix for each concrete mix.
- D. Steel reinforcement shop drawings, including material, grade bar schedules, spacing, bent bar diagrams, arrangement and supports.
- E. Submit contraction (crack control) joint, expansion, isolation and construction joint layout to Architect for approval.
- F. Project Record Documents:

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1. Accurately record actual locations of embedded utilities and components that are concealed from view.
2. Maintain an accurate record showing date and time of concrete placement in each portion of structure. Correlate placing record for test cylinders made by testing laboratory. Maintain a separate record giving date of removal of forms, shoring, including first and second halves and reshoring, if used. Keep records available for inspection at site. Upon completion, deliver two copies of each to Architect in approved form.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with Section 1905A.1.16, California Building Code, and ACI 318 Section 26.12.
- B. Maintain one copy of all records.
- C. Acquire cement and aggregate from same source for all work.
- D. Conform to ACI 318 Section 26.5.5, when concreting during hot weather. No concrete placement permitted above 90 degrees Fahrenheit.
- E. Conform to ACI 318 Section 26.5.4 when concreting during cold weather. No concrete placement permitted below 50 degrees Fahrenheit.
- F. Installer Qualifications, Concrete [Stain] [Color]: Minimum 5 years experience with installing stain and color products specified, certified and approved by the manufacturer.

1.05 COORDINATION

- A. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I or II. Portland Cement Type, conforming to Section 1903A, California Building Code.

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- B. Aggregates:
 - 1. Aggregate for Stone Concrete: ASTM C33.
 - 2. Aggregate for Lightweight Concrete: ASTM C330.
- C. Conform to requirements specified herein for maximum size of aggregate permitted in individual applications.
- D. Water, ASTM C1602: Clear, from potable source, and not detrimental to concrete.
- E. Fly Ash:
 - 1. Fly ash: may be used at 25% replacement of the Portland cement, at a 1:1 replacement ratio by weight. The fly ash shall meet the requirements of ASTM C 618 with the exception that the Loss on Ignition (LOI is a measure of the loss in mass of a fly ash sample when placed in a 750 degrees C oven) shall not exceed 1.0%. Only Class F material is permitted, CBC Section 1903A.5.
 - 2. When fly ash is used the quantity of water shall be determined on a water-cement plus fly ash basis.
 - 3. Comply with requirements of DSA IR 19-3 fly ash in excess of 15% by weight, per 2022 CBC, Section 1903A.5. including requirement for mix design to bear Civil Engineer's signature and seal.

2.02 ACCESSORIES

- A. Concrete Formwork: In accordance with Section 03 10 00.
- B. Reinforcement: In accordance with Section 03 20 00.
- C. Bonding Agent: ASTM C631, Polyvinyl Acetate Latex emulsion; HIBOND, manufactured by Lambert Corporation, Orlando FL, LOCK BOND NO. 906, manufactured by Macklanburg-Duncan Co., City of Industry, CA, or equal.
- D. Curing Film: ASTM C171; 10 mil thick, clear polyethylene film, single sheet, manufactured from virgin resin with no scrap or additives, free of visible defects, uniform in appearance, conforming to the following:
 - 1. Moisture Loss: 0.055 g per sq. cm.
 - 2. Tensile Strength: 1700 psi longitudinal, 1200 psi transverse.
 - 3. Elongation: 225 percent longitudinal, 350 percent transverse.
- E. Non-Shrink Grout: ASTM C1107, Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing

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minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; of consistency suitable for application and a 30-minute working time.

- F. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8" and that can be feathered at edges to match adjacent floor elevations. Products by Tile-Tex by Flintkote Co., Webtex #60 or Fixallatex by Dowman Products Co or equal.
- G. Interior/Exterior Compound: ARDEX TILT WALL PATCH or equal as approved in accordance with Division 01 for substitutions., cementitious surface treatment for filling and smoothing interior and exterior vertical concrete surfaces prior to sealing or painting.
- H. Waterstops: Flexible PVC type, factory-installed metal eyelets for embedding in concrete to prevent passage of fluids through joints, factory-fabricated corners, intersections and directional changes. Flat serrated [Serrated] or dumbbell without centerbulb [with centerbulb] for contraction (non-working joints) [for expansion (working joints)] joints, 6 inches, 1/4-inch-thick, unless noted otherwise on drawings. By Greenstreak/Sika, Inc. St. Louis, Missouri, BoMetals Inc. Powder Springs, GA or equal.
- I. Waterstops: Flexible strip, active bentonite/butyl rubber waterstop field installed in concrete to prevent passage of fluids through joints, RX 101 or RX 102 unless noted otherwise on drawings. By Waterstop-RX by Building Materials Group, Greenstreak/Sika, Inc. St. Louis or equal.
- J. Secondary Reinforcement (shrinkage control): Synthetic-fiber-reinforced concrete contains virgin homopolymer polypropylene. Fibrillated polypropylene fibers engineered and designed for use in concrete, complying with ASTM C1116, Type III, 1/2 to 1-1/2 [1-1/2 to 2] inches long by the Forta Corporation, GCP Applied Technologies or equal. Dosage: 1.5 lbs per cubic yard of concrete [0.2%, 3.0 lbs/cu.yd] [0.33%, 5.0% lbs/cu.yd.]

2.03 JOINT DEVICES AND FILLER MATERIALS

- A. Fiber Expansion Joint Filler - ASTM D1751: Closed cell, 1/2 inch max. thick; FIBER EXPANSION JOINT by American Highway Technology, Kankakee, IL, FIBRE EXPANSION JOINT or DECK-O-FOAM by W. R. Meadows, Dayton Superior or approved equal.
- B. Expansion Joint Top: Integral extruded polystyrene plastic; 1/2 inch thick, with removable top strip exposing sealant trough, JOINT CAPS manufactured by The Burke Company, or equal.
- C. Primer: As recommended by sealant manufacturer.

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- D. Joint Backing: ASTM C1330, Cylindrical, Type C, closed cell, polyethylene backer rod; oversized 30 to 50 percent larger than joint width. Green Rod by Nomaco Inc. or equal.
- E. Sealant: Polyurethane two-component type, self-leveling, for level surface application, UREXPAN NR-200 or DYNATRED for sloped surfaces, manufactured by Pecora Corp., Harleysville PA, or equal. Color shall be selected by Architect.
- F. Saw-Cut Joint Filler: Two-component epoxy resin, gray color, non-hardening, self-leveling, SIKADUR 51 (SL), by Sikacorp., Lyndhurst, NJ, or equal.

2.04 CONCRETE MIX

- A. Mix and deliver concrete in accordance with ACI 318 Sections 26.4 and 26.5. Deliver concrete in transit mixers only. Discharge loads in less than 1-1/2 hours after water is first added.
 - 1. Design Mix: Conform to Section ACI 318 Chapter 26 for Proportioning on the basis of field experience or trial mixtures method.
 - 2. Conform to ACI 318, Section 26.4 for Selection of concrete proportions method. Selection of concrete proportions and ingredients for design mix by a DSA [OSHPD] approved Testing Laboratory and certified by a registered civil engineer licensed in California.
 - 3. Do not exceed 0.45 water-cement ratio by weight for floor slabs and for other concrete.
- B. Select proportions by volume for concrete in accordance with the approved design mix.
 - 1. Required Strength: As noted on the structural drawings and below.
 - 2. Grout Mix: 1:3:2 Portland Cement, to sand, to pea gravel, minimum 2000 psi at 28 days.

- C. Provide concrete to the following criteria:

Element	Min 28 day Strength PSI	Max Slump	Max Size Aggregate Type
Grade Beams and Foundations	4,000	4 inch	1 inch Normal wt. Concrete
Flr. Slabs on grade	4,000	4 inch	3/4 inch Normal wt. Concrete
Other	3,000	4 inch	3/4 inch Normal wt. Concrete

- D. Miscellaneous Sitework Concrete: Specified in Section 32 13 13, Sitework Concrete.

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- E. Do not use admixtures containing chlorides.

2.05 GRANULAR FILL

- A. Crushed Aggregate Base (capillary break): 3/4 inch maximum grading, crushed rock and rock dust conforming to requirements of Section 200-2.2, SSPWC, with 3/8 inch sieve requirement waived, or Class 2 Aggregate Base as defined in Section 26, CSS.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely and will not cause hardship in placing concrete.

3.02 PREPARATION

- A. Prepare previously placed concrete by cleaning with sandblasting to remove laitance and expose clean aggregate.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. When approved by the Architect, clean previously placed concrete with steel brush and apply bonding agent in accordance with manufacturer's instructions.
- D. Under Interior Slabs on Grade: Install 4 inches thick crushed aggregate base per Section 200-2.2, SSPWC or Class 2 CCS as capillary break. Over aggregate base place 15-mil vapor retarder in largest practical sections. Seal all 6-inch lapped seams, penetrations and foundation perimeters using manufacturer-approved tape only and install per manufacturer instructions. Install pipe boots at pipe penetrations. [Install rigid insulation]. Install reinforcement and concrete as scheduled.
 - 1. Tapes, mastics, sealants, and other products used with vapor retarder shall be from same manufacturer as, and certified compatible with, vapor retarder.
- E. Install steel reinforcing per Section 03 20 00. Place concrete slab as scheduled.

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3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI 318, Section 26.5.2. Remove loose dirt from excavations.
- B. Notify Architect minimum 24 hours prior to commencement of operations. All excavations, forms and reinforcing shall be inspected and approved by the Architect prior to placement.
- C. Ensure reinforcement, inserts, embedded parts, formed joint fillers, joint devices and accessories are not disturbed during concrete placement.
- D. Install joint fillers, primer and sealant in accordance with manufacturer's instructions.
- E. When detailed on the drawings, separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.
- F. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface using two-component polyurethane sealant as specified in Section 07 92 00.
- G. Install joint devices in accordance with manufacturer's instructions as detailed.
- H. Install construction joint device in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- I. Maintain joint device in correct position to allow joint cover flush with finish.
- J. Install joint covers in longest practical length.
- K. Place concrete continuously between predetermined expansion, control and construction joints.
 - 1. Install expansion joints at vertical concrete walls at 24 feet on center unless noted otherwise on drawings.
- L. Do not interrupt successive placement; do not permit cold joints to occur.
- M. Avoid segregation of materials. Perform vibrating so as to produce a dense, smooth application free of rock pockets and voids. Do not use vibrators to move concrete horizontally.
- N. Provide special mix prepared by the Testing Laboratory and approved by the Architect utilizing smaller aggregates in areas of reinforcing congestion to prevent the formation of rock pockets.
- O. The unconfined vertical drop of concrete shall not be greater than 5 feet. Do not allow concrete to fall free from any height that will cause materials to segregate. Maximum

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height of free fall permitted in any case: 5 feet. Utilize trunks or additional chutes where doubt occurs. Conform to requirements of ACI 318, Section 26.5.2.

- P. Construction Joints: Wash surface of each joint shortly after pouring to expose clean, sound aggregate. Sandblast surface to remove laitance remaining or loose aggregate as approved by the Architect. Conform to ACI 318, Section 26.5.6. Apply bonding agent in accordance with manufacturer's instructions. Locate joints within the middle third of spans of slabs, beams and girders. Coincide construction joints with contraction, isolation, or expansion joints when possible. Locate where they least affect the structural integrity of the element under consideration and are compatible with building's appearance.
- Q. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/8 inch in 10 ft. Slope floors for drains.
- R. Contraction Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch, place joints at column lines and at 12 ft. o.c. each way, maximum. Remove groover tool marks on exposed concrete surfaces. Contractor's option: Saw cut joints, early-entry dry-cut, per ACI 302.1R.
- S. Saw cut slabs when indicated on drawings or as approved by Architect at 12 ft. on center, within 4-12 hours after placing concrete. Saw cut joints with power saws equipped with shatterproof abrasive re diamond-rimmed blades, cut 1/8 " wide joint into concrete when cutting action will not tear, abrade, or otherwise damage surface. Cut no deeper than 1/4 depth of slab thickness. Fill cuts with non-hardening epoxy. Completely fill cut to surface of slab. Sawing and timing: "early-entry dry-cut ", per ACI 302.1R. Section 8.3.12.
- T. Isolation Joints: preformed joint filler depth of slab, fill top 1/2 inch with elastomeric sealant per Section 07 92 00. Locations: at columns, footings, and as noted on drawings.
- U. Steel Pan Stairs: Install safety nosings at each tread, all steel pan stairs.
- V. Surface irregularities, ACI 347R Class A, gradual or abrupt irregularities of 1/8 inch for exposed to view concrete. Class B, 1/4 inch for plaster cement finish.

3.04 FINISH AT ALL EXPOSED SURFACES

- A. Refer to Section 03 20 00, Concrete Formwork.

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3.05 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.
- B. Maintain concrete with minimal moisture loss at above 50 degrees F temperature for period necessary for hydration of cement and hardening of concrete. Dusting with dry cement to absorb excess water is prohibited.
- C. Cure floor surfaces only as specified herein and in accordance with Section 1905A.11, California Building Code. Liquid membrane curing compound method not permitted for interior cast-in-place concrete slabs.
- D. Moisture Retaining Coverings: spread polyethylene film over floor slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for minimum of seven (7) day unless noted otherwise on the drawings. Do not permit traffic over floor slabs during the curing period.
- E. Vertical Surfaces: Spray water over surfaces and maintain wet for 10 days.
- F. Quality Control: Proper curing of concrete surfaces shall be the responsibility of the Contractor under this section.

3.06 FIELD QUALITY CONTROL

- A. Provide free access to Work and cooperate with Testing Laboratory.
- B. Measure floor and slab flatness and levelness according to ASTM E1155 within 72 hours of finishing.
- C. Proposed mix design of each class of concrete shall conform to ACI 318, Section 26.4, California Building Code and shall be approved by the Architect prior to commencement of work.

3.07 PATCHING

- A. Architect will inspect concrete surfaces and determine imperfections, if any.
- B. Patch imperfections as approved and in accordance with ACI 301.
 - 1. Clean all exposed concrete surfaces and all adjoining work stained by leakage of concrete. Remove all fins, butts and projections by grinding. Patch voids, rock pockets, holes, cracks and similar imperfections by chipping loose concrete and exposing clean, sound aggregate.

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2. Fill cone form tie recesses with portland cement mortar flush to finish surface.

3.08 PROTECTION FOR EXPOSED CONCRETE TO BE TREATED OR SEALED

- A. Protection. There is no known satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Protect the concrete floor until ready for treatment/sealing.
 1. All hydraulic powered equipment must be diapered to avoid staining of the concrete.
 2. No trade shall park vehicles on interior slabs. If necessary to complete their scope of work, drop cloths shall be placed under vehicles at all times.
 3. No pipe cutting machine shall be used on interior slabs.
 4. Steel shall not be placed on interior slabs to avoid rust staining.
 5. All equipment must be equipped with non-marking tires.
- B. Flooring shall be protected as follows: Use "Ram Board Plus ", Burbank, CA. "Builder Board with Liquid Shield " by Surface Shields, Oakland Park, ILL, or equal.
 1. Ram Board: Heavy Duty temporary floor protection membrane, 38 " wide x 100' rolls, 46 mils thick.
 2. Protect entire floor where area anticipated to be affected. Submit layout of protected area to Architect for approval.
 3. Loose lay protection material over floor area; tape all seams; do not tape or otherwise attach to floor; follow manufacture's installation requirements.
 4. Take other precautions as necessary to prevent damage in addition to requirements above, refer to Section 03 35 00 [03 35 43]. Submit to Architect for approval.

3.09 DEFECTIVE CONCRETE

- A. Defective Concrete: Remove concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect.
- C. Do not patch, fill, touch-up, repair or replace exposed concrete except upon express approval of Architect for each individual area.

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3.10 MOISTURE TEST FOR CONCRETE FLOORS

- A. It shall be the Contractor's responsibility to provide a concrete floor slab meeting the maximum moisture vapor emissions here-in specified and the Contractor shall exercise care in all aspects of mixing, placing, and curing the concrete floor slabs so that a minimum of mitigation treatment will be required.
- B. Prior to ordering adhesives applied floor covering materials or coatings, conduct Calcium-Chloride Test Method in accordance with ASTM F1869 and ASTM F2170 to

verify that concrete floor slabs are dry with maximum moisture vapor emissions of 3 pounds per 1,000 square feet in 24 hours and that slabs exhibit negative alkalinity, carbonation or dusting. Apply the moisture test in four (4) different areas of each floor location, with at least one test for each 1,000 square feet of floor area.

- C. Prior to ordering adhesive-applied floor covering materials or coatings, conduct Relative Humidity Test Method in accordance with ASTM F1869 and ASTM F2170 to verify relative humidity and surface pH of concrete floor slabs, the method
 1. Requires drilling holes at diameter not to exceed outside diameter of probe by more than 0.04 inch to depth equal to 40 percent of slab's thickness (elevated structural slab shall be tested at depth equal to 20 percent of slab thickness).
 2. Place probe to full depth of test hole, place cap over probe.
 3. Permit test site to acclimate, or equilibrate, for 72 hours prior to taking relative humidity readings.
 4. Remove cap and press button on the probe to obtain reading.
 5. Relative humidity readings for substrates receiving non-permeable flooring are 75% or lower.
 6. Testing shall require 3 tests in first 1,000 square feet, with one additional test per each additional 1,000 square feet of concrete slab surface.
- D. Alkalinity Testing: Concrete floors shall be tested for alkalinity prior to the installation of adhesive-applied floor covering materials or coating. Levels of pH shall not exceed the written recommendations of the flooring covering manufacturer or the adhesive manufacturer, or both.
- E. The test area should be at the same temperature and humidity expected during normal use, minimum testing conditions shall be 75+ 10 degrees F. and 50+ 10% relative humidity. Maintain these conditions 48 hours prior to, and during testing.
- F. Install Concrete Slab Vapor Emission Treatment as specified in Section 09 05 61. Submit results to Architect of testing.

END OF SECTION

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SECTION 03 35 03 - CONCRETE SLAB FINISHING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Concrete finish requirements for unformed horizontal concrete surfaces. This section supplements requirements of Division 03 Section "Cast-In-Place Concrete."
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.03 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for sealers, indicating VOC content.
- B. Product Test Reports:
 - 1. Slip-resistance test reports from qualified independent testing agency.

1.04 QUALITY ASSURANCE

- A. Standards: Comply with the following documents, except where requirements of the contract documents are more stringent:
 - 1. ACI 301.

PART 2 - PRODUCTS

2.01 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Sealers:
 - a. VOC content limits for field applications.

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2.02 PERFORMANCE REQUIREMENTS

- A. Slip Resistance, Coefficient of Friction: For sealers on walking surfaces, provide products with the following values as determined by testing identical products in accordance with the following:
1. Level Surfaces, Dry and Wet: DCOF of not less than 0.42 in accordance with ANSI A326.3.

2.03 CONCRETE SLAB SEALER

- A. Concrete Slab Sealer: Liquid chemical hardener; enhanced silicate or silicate type.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Curecrete Chemical; Ashford Formula.
 - b. Dayton Superior; Sure Hard Densifier J17.
 - c. Laticrete; L&M Lion Hard.

2.04 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified product that can be applied in thicknesses from a feathered edge to 1/2 inch to match adjacent floor elevations.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ardex; Feather Finish.
 - b. Dayton Superior; Sure Finish.
 - c. Laticrete; Supercap.
 2. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 3. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 4. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 5. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ardex.
 - b. Dayton Superior.
 - c. Laticrete.
 2. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.

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3. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
4. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
5. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.05 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Contraction Joint Filler:
 1. Sealant: As specified in Section 07 92 00.
- B. Concrete Cleaner: Liquid concentrate, biodegradable, heavy-duty cleaner-degreaser compound.

PART 3 - EXECUTION

3.01 FINISHING SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.
 1. Apply scratch finish to surfaces as follows:
 - a. To receive concrete floor toppings.
 - b. To receive mortar setting beds for bonded cementitious floor finishes.
 - c. Other surfaces indicated.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
 1. Apply float finish to surfaces as follows:
 - a. To receive trowel finish.
 - b. To be covered with fluid-applied or sheet waterproofing,.
 - c. Other surfaces indicated.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 1. Apply trowel finish to surfaces as follows:
 - a. Exposed to view.
 - b. To receive concrete sealer.
 - c. To receive polishing.

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- d. To be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage/waterproofing/crack-isolation membrane, paint, or another thin-film-finish coating system.
- e. Other surfaces as indicated.
- 2. Finish surfaces to the following Specified Overall Value (SOV) and Minimum Local Value (MLV) tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Carpeted Floors: Specified overall values of flatness, F(F) 25; and of levelness, F(L) 17; with minimum local values of flatness, F(F) 20; and of levelness, F(L) 15.
 - b. Polished Concrete Floors: Specified overall values of flatness, F(F) 40; and of levelness, F(L) 30; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 20.
 - c. Noncritical Floors: Specified overall values of flatness, F(F) 25; and of levelness, F(L) 17; with minimum local values of flatness, F(F) 20; and of levelness, F(L) 15.
 - 1) Floors Include: Exposed concrete slabs in nonpublic areas, subfloors under concrete topping slabs, and slabs scheduled for mortar beds.
 - d. Other Floors at Slabs on Grade: Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
 - e. Other Floors at Suspended Slabs: Specified overall values of flatness, F(F) 35; and of levelness, F(L) 24; with minimum local values of flatness, F(F) 20; and of levelness, F(L) 15; for suspended slabs.
- 3. F(L) tolerances do not apply to randomly trafficked floor surfaces that are inclined or cambered.
- 4. F(L) tolerances do not apply to shored, elevated construction after shoring has been removed.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Apply trowel and fine broom finish to surfaces as follows:
 - a. To receive ceramic or quarry tile installed by either thickset or thin-set method.
 - b. To receive traffic coatings.
 - c. Exposed interior stair treads/landings, steps, and ramps.
 - d. Other surfaces indicated.
 - 2. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
 - 1. Apply broom finish to surfaces as follows:
 - a. Exterior concrete platforms, steps, and ramps.
 - b. Other surfaces indicated.

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3.02 REPAIRING SLAB SURFACES

A. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.

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- d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
 - B. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
 - C. Repair materials and installation not specified above may be used, subject to Architect's approval.
- 3.03 SEALED CONCRETE FLOORS
- A. Concrete Slab Sealer:
 - 1. Apply sealer/finish following manufacturer's printed application instructions; apply single saturation coat.
 - 2. Remove surplus sealer/hardener and rinse according to manufacturer's instructions.
 - 3. Burnishing: Prior to substantial completion, apply light second coat of chemical sealer-hardener material and polish using mild abrasives or brushes in accordance with sealer/hardener manufacturer's recommendations. Buff to even satin sheen.
 - 4. Location: At all interior, exposed slabs subject to pedestrian traffic, unless indicated otherwise.
- 3.04 FIELD QUALITY CONTROL
- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
 - 1. Coordinate floor and slab flatness and levelness testing with Owner's testing agency according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION

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SECTION 05 12 00 - STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Structural steel framing members.
 - 1. Galvanized, prime and paint, at exterior exposed structural steel.
 - 2. Shop-primed at concealed and at painted steel.
- B. Related Sections:
 - 1. Section 09 91 00, Painting.

1.02 REFERENCE STANDARDS

- A. Conform to current adopted reference standards by date of issue of the current code cycle and the date of the Contract Documents.
- B. AISC - American Institute of Steel Construction:
 - 1. AISC Manual - AISC Manual of Steel Construction (AISC 325), 16th Edition.
 - 2. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
 - 3. AISC 360 - Specification for Structural Steel Buildings.
 - 4. AISC 341 - Seismic Provisions for Structural Steel Buildings including Supplement No. 1.
- C. ASTM International:
 - 1. ASTM A36 - Structural Steel
 - 2. ASTM A53 - Steel Pipe, Black and Hot-Dip Zinc-Coated, Welded and Seamless
 - 3. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality
 - 4. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products
 - 5. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware
 - 6. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners
 - 7. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
 - 8. ASTM A500 - Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes
 - 9. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
 - 10. ASTM A572 - Grade 50 - Structural Steel
 - 11. ASTM A780 - Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
 - 12. ASTM A992 - Steel for Structural Shapes for Use in Building Framing
 - 13. ASTM C1107 - Packaged Dry, Hydraulic Cement Grout (Non-Shrink)
 - 14. ASTM F1554 - Standard Specification for Anchor Bolts.
 - 15. ASTM F1554 - Standard Specifications for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

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- D. ASCE/SEI 7 - American Society of Civil Engineers, Structural Engineers Institute, ASCE Standard.
- E. AWS - American Welding Society:
 - 1. AWS A2.4 - Standard Symbols for Welding, Brazing and Non-Destructive Examination.
 - 2. AWS A5.1 - Carbon Steel Electrodes for Shielded Metal Arc-Welding.
 - 3. AWS A5.5 - Low Alloy Steel Electrodes for Shielded Metal Arc-Welding.
 - 4. AWS B2.1 - Welding Procedure and Performance Qualification.
 - 5. AWS D1.1 - Structural Welding Code, Steel.
 - 6. AWS D1.2 - Structural Welding Code, Aluminum.
 - 7. AWS D1.3 - Structural Welding Code, Sheet Steel.
 - 8. AWS D1.6 - Structural Welding Code, Stainless Steel.
 - 9. AWS D1.8 - Structural Welding Code, Seismic Supplement.
- F. SSPC - Steel Structures Painting Council.
- G. CBC - California Building Code 2022, Chapter 22A.

1.03 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing and locations of structural members, connections, openings, attachments and fasteners.
 - 2. Indicate cambers.
 - 3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- B. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- C. Mill Test Reports: showing structural strength, destructive and non-destructive test analysis and identification.
- D. All certified welders employed on the work have been AWS qualified within the previous 12 months, in accordance with AWS-WHB-1.
- E. Fabricator's and erector's qualifications and certifications.
- F. Submit written welding procedures to Owner's testing agency for all welding on project. Procedures shall be in accordance with AWS pre-qualified welds. For welds not pre-qualified by AWS, provide project-specific procedures qualified by testing in accordance with AWS D1.1 to match actual materials, conditions, and orientations.
- G. Paint Compatibility Certificates: From manufacturer of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

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1.04 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Fabricator: Company specializing in performing structural steel work minimum five years' experience. Qualified fabricator who participates in the AISC Quality Certification Program and its designation as AISC-Certified Plant, Category Sbd Conventional steel building structures or Category Cbd for complex steel building structures.
 - 2. Erector: Company specializing in performing structural steel work with minimum five years' experience.
 - 3. Erector: AISC Certified Erectors for Category CSE-Certified Steel Erector for steel and erection required.
 - 4. City of Los Angeles Department of Building and Safety certification (license) for the steel Fabricator and Erector is acceptable in lieu of certification by AISC.
 - 5. AWS Certified welders.
 - 6. DSA-Projects: All welding shall be specially inspected by an AWS-CWI Qualified Inspector.
- B. Fabricate structural steel members and perform work in accordance with AISC-M015L.
- C. Perform welding in accordance with AWS D1.1 and California Building Code Section 2204A.1.
- D. Galvanized Structural Steel Coating applicator: Company specializing in hot-dip galvanizing after fabrication and following the procedures in the *Quality Assurance Manual* of the American Galvanizers Association.

1.05 FIELD MEASUREMENTS

- A. Verify field measurements.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Wide Flange Sections: ASTM A992.
- B. Channels, Angles, Plates, Bars, M-Shapes and S-Shapes: ASTM A36.
- C. Structural Tubing: Hollow Structural Sections (HSS), ASTM A500, Grade B, minimum yield strength, 42 ksi.
- D. Pipe: ASTM A53, Type E or S, Grade B, Schedule 40.

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- E. Bolts, Nuts and Washers: ASTM A307 galvanized to ASTM A153 for galvanized members, American National Course Threaded Series.
- F. Anchor Bolts, Pins and Rods: ASTM F1554 Grade 36 unless noted otherwise on Structural Drawings.
- G. Anchor Bolts High Strength: ASTM F1554 Grade 105, zinc coated, at exterior exposed locations unless otherwise noted on Structural Drawings.
- H. Welding Materials: AWS A5.1, E70XX, type and procedures required by electrode manufacturer for materials being welded.
- I. Non-Shrink Grout: ASTM C1107, high performance, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 5,000 psi in 24 hours and 8,000 psi in 7 days; of consistency suitable for application and a 30 minute working time.
- J. In-Shop Primer: Series L69 Hi Build Epoxoline II, Red color Low VOC epoxy, air dried, by Tnemec or equal. [Manufacturer's standard primer for unpainted steel permanently enclosed in walls and above finished ceilings.]
- K. Touch-Up Material for Galvanized Steel: ASTM D520 Type III High Purity Grade zinc dust, ready mixed, zinc-rich galvanizing compound 95% metallic zinc. Galviline by ZRC Worldwide, Marshfield, MA or equal.
 - 1. 3/16-inch for more than 5/8-inch diameter.

2.02 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP-3 Power Tool Cleaning for embedded steel. Apply primer by brush or spray, minimum dry film thickness 3.0 mils.
- B. Shop prime structural steel members. DO NOT prime surfaces that will be fireproofed, field welded, in contact with concrete or high strength bolted.
 - 1. Clean surfaces to be primed, remove mill scale, grease, dirt and foreign matter. Two coats required for parts in contact but inaccessible for painting after erection.
 - 2. Apply primer by brush or spray, minimum dry film thickness 3.0 mils. Thoroughly work into joints, angles and open spaces. Allow primer to dry and harden prior to handling for delivery to the site.
 - 3. Clean contact surfaces immediately prior to assembly, leave unpainted.
 - 4. Coat machined surfaces with approved removable coating to prevent corrosion.
 - 5. After erection, clean field welds, field bolts and abraded portions and apply one additional brush spot coat using same paint material.
 - 6. All surfaces scheduled to receive sprayed-applied fireproofing shall be free of lubricants, oils, paint or other matter that will impair adhesion of fireproofing.

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- C. Galvanize exposed exterior structural steel members where indicated to minimum Coating Grade 80 (1.9 oz/sq. ft.) in accordance with ASTM A123.
- D. Galvanized items to be painted: Do not use quenching solutions or treatments immediately after galvanizing. Refer to individual sections for galvanized items to be painted, and to Section 09 90 00, Painting.
- D. All exterior steel exposed to weather conditions shall be shop galvanized and primed painted. Field painted in accordance with Section 09 90 00 Painting, High Performance Coatings.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
 - 1. Report discrepancies between drawings and field dimensions to Architect before commencing work.
- B. Beginning of installation means erector accepts existing conditions and surfaces underlying or adjacent to work of this section.

3.02 FABRICATION

- A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.
- B. Camber structural steel members where indicated.
- C. Identify high-strength structural steel according to ASTM A6 and maintain markings until steel has been erected.
- D. Mark and match-mark materials for field assembly.
- E. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
- F. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
- G. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.

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3.03 ERECTION

- A. Allow for erection loads and stresses, and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of permanent bracing. Provide bracing for dead and live loads and wind loads. Keep bracing in place until required to maintain safe conditions.
- B. Contractor shall be responsible for correcting detailing and fabrication errors and for correct fitting of all members and components.
- C. Field weld components and shear studs indicated on structural drawings.
- D. Do not field cut or alter structural members without approval of Architect.
- E. When approved, perform cutting, punching, drilling and tapping to accommodate work. Obtain accurate data as indicated on shop and erection drawings.
- F. After erection, prime welds, abrasions and surfaces not shop primed except surfaces to be in contact with concrete.
- G. Grout under base plates with the specified non-shrink grout.
- H. Provide anchor bolts with templates and diagrams. Contractor shall be responsible for proper location and installation of bolts. Correct deficiencies or errors.

3.04 ERECTION TOLERANCES

- A. Conform to AISC 303 Code of Standard Practice for Steel Buildings and Bridges.

3.05 HIGH STRENGTH BOLTS

- A. Allowable hole sizes: 1/16 inch larger than bolt size.
- B. Use friction type connection with standard hardened steel circular, square or rectangular washer under bolt nut.
- C. Thoroughly clean area under bolt head, nut and washer. Remove all paint, lacquer, oil or other coatings except organic zinc-rich paints in accordance with SSPC, SP-2.
- D. Tighten bolts by power torque wrench or hand wrench until twist-off.

3.06 PUNCHING AND DRILLING

- A. Punch material 1/16 inch larger than nominal diameter of bolt, wherever thickness of metal is equal to or less than the diameter of the bolt plus 1/8 inch.

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- B. Drill or sub-punch and ream where metal is equal to or more than the diameter of the bolt plus 1/8 inch. Make diameter for sub-punched and sub-drilled holes 1/16 inch larger than nominal diameter of bolt.
- C. Precisely locate holes to ensure passage of bolt through assembled materials without drifting. Enlarge holes when necessary to receive bolts by reaming, flame cutting to enlarge holes is not acceptable. Poorly matched holes will be rejected.
- D. Punch and ream holes to receive high strength bolts.

3.07 WELDING

- A. Conform to AWS D1.1 and CBC Chapter 22A, Section 2204A.1.
- B. Perform welding by direct electric arc process. Use operators certified within preceding 12-month period as per AWS "Standard Qualification Procedure."
- C. Chip welds to remove slag. Use wire brush to demonstrate uniformity of section, smoothness of welded metal, freedom from undercuts, overlays or feather edges and freedom from porosity and clinkers.
- D. Visually inspect edges and ends of fillets and butt joint welds for indication of good fusion and penetration into base metal. Grind smooth all exposed welds.
- E. Use of cutting torch will be allowed where metal being cut does not carry stress during the operations and provided no stresses will be transmitted through a flame-cut surface. Make gas cuts smooth and regular in contour.
- F. To determine effective width of members subjected to gas cutting, deduct 1/8 inch from width of gas cut edges. Make radius of gas cut fillets as large as practicable, but in no case less than one inch. Gas cutting to align bolt is not permitted.

3.08 CLEANING AND STRAIGHTENING

- A. Before fabrication, thoroughly wire-brush material clean of scale and rust. Straighten by methods that will not injure materials.
- B. After punching or working, remove twists or bends before parts are assembled. Make finished members free from twists, bends and open joints when erected.
- C. Touch-Up Material for Galvanized Steel: Ready mixed, zinc-rich galvanizing compound, ASTM A780 - A2. Repair Using Paints Containing Zinc Dust, minimum thickness 5 mils.
- D. Repair galvanized surfaces, where bare metal is exposed at weld sites and where shop finish is abraded or otherwise damaged, Use hot or cold repair process at contractor's option, build-up zinc coating to minimum 5-mil thickness.

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1. Cold Repair Process: ASTM A 780, A2 using ready mixed, fluid applied galvanizing repair compound.
2. Hot Repair Process: ASTM A 780, A1 using zinc-based alloys. Apply zinc solder while metal is still hot. Tin surface with zinc alloy and wire brush. Do not direct flame on alloy.

3.09 FITTING

- A. Closely fit members, finished true to line and in precise position required to allow accurate erection and proper joining in the field.
- B. Drilling to enlarge unfair holes will not be allowed. Light drifting to draw parts together will be permitted. Do not heat rolled sections, except for minor details.

3.10 QUALITY CONTROL

- A. Required testing shall be performed under provisions of Division 01, General Requirements and California Building Code Section 2205A.
- B. All complete penetration welds shall be subject to Ultrasonic Testing, as per AWS D1.1. All defective welds shall be repaired and retested with ultrasonic equipment at the Contractor's expense.

3.11 HANDLING

- A. Both in shop and in field, transport, handle and erect to preclude damage or overstressing of any component.

3.12 FINISH

- A. For exposed steel, field paint per Section 09 91 00 Painting with High Performance Coatings.

END OF SECTION

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SECTION 05 30 00 – METAL DECKING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Steel floor and roof deck.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116, Volatile Organic Compound (VOC) Restrictions, for VOC limits pertaining to adhesives, sealants, fillers, primers, and coatings.
- B. Section 01 8113, Sustainable Design Requirements, for CAL-Green general requirements and procedures.
- C. Section 03 30 00, Cast-In-Place Concrete.
- D. Section 05 12 00, Structural Steel Framing.

1.03 REFERENCES AND STANDARDS

- A. California Building Code (CBC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Green Building Standards Code (CALGreen), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. American Iron and Steel Institute (AISI):
 1. North American Specification for the Design of Cold-Formed Steel Structural Members.
- D. ASTM International (ASTM):
 1. A36/A36M: Standard Specification for Carbon Structural Steel.

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2. A653/A653M: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. A780/A780M: Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
4. C423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

E. American Welding Society (AWS):

1. D1.1/D1.1M: Structural Welding Code, Steel.
2. D1.3/D1.3M: Structural Welding Code - Sheet Steel.
3. A5.1/5.1M: Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.
4. A5.5/A5.5: Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding.

F. Steel Deck Institute (SDI):

1. Publication 31: Design Manual for Composite Decks, Form Decks and Roof Decks.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures:

1. Action Submittals and Informational Submittals shall be submitted in accordance with Section 01 3300, Submittal Procedures.
2. Closeout Submittals shall be submitted in accordance with Section 01 7700, Closeout Procedures.
3. Sustainable Design Submittals shall comply with the additional requirements of Section 01 8113, Sustainable Design Requirements.

B. Pre-Installation Meeting:

1. Schedule a meeting to review the Structural Documents prior to development of shop drawings.
2. The meeting shall be attended by pertinent parties which, at a minimum, shall include the Contractor, Architect, fabricator, erector, Owner's Project Inspector, Owner's Testing Agency, and Structural Engineer.

C. Coordination:

1. Provide holes and reinforcement for mechanical and electrical penetrations.

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2. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

1.05 ACTION SUBMITTALS

A. Shop Drawings:

1. General:
 - a. Obtain reviewed structural steel shop drawings and verify all conditions before preparing shop drawings for metal decking.
 - b. Show members required for support of metal decking on shop drawings for metal decking.
2. Show layout and types of deck units, anchorage details, welding requirements and conditions requiring closure strips, required number and location of shear connectors on each member, supplementary framing, cut openings, special jointing, and other accessories.
3. Details must reference detail callouts on the construction documents.

B. Product Data: Manufacturer's specifications, physical properties, design load tables and installation instructions for each type of decking and accessories. Include ICC "Evaluation Reports" for the following:

1. Each metal decking product.
2. Mechanical fasteners used in lieu of welding for fastening deck to supporting structures in accordance with stud base qualification requirements of AWS Code Appendix IX.

1.06 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following.

1. Fabricator.
2. Erector.
3. Welders.

B. Welding Documents: Welding Procedure Specifications (WPSs), Procedure Qualification Records (PQRs), and Welder Qualification Test Records (WQTRs) prepared in accordance with AWS D1.3/D1.3M for each type of weld and position to be performed to the Owner's Testing Agency for review.

C. ICC-ES Report confirming compliance of steel deck with regulatory fire-resistance requirements.

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D. Certification: Manufacturer's certification of compliance with the Specifications.

E. Record of Pre-Installation Meeting.

F. Sustainable Design:

1. General:

- a. Submit information necessary to establish and document compliance with the California Green Building Standards Code.
- b. Sustainable design submittals are in addition to other submittals.

2. The following information shall be provided:

- a. Paints and Coatings: Evidence of compliance that products meet maximum VOC content limits specified in Section 01 6116.

1.07 CLOSEOUT SUBMITTALS

A. Guarantee: Submit subcontractor's guarantee.

1.08 QUALITY ASSURANCE

A. Qualification of Field Welding: Use qualified welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1/D1.1M.

1. Fabricator and Erector shall provide Architect and Testing Laboratory with names of welders to be employed on Work, together with certification that each of these welders has passed qualification tests within last year using procedures covered in American Welding Society Standard D.1.3/D1.3M.
2. If recertification of welders is required, retesting will be Contractor's responsibility.
3. Welding shall be performed by qualified light gage (sheet steel) welders. A welder producing unsatisfactory welding, even though the welder has passed qualification tests, shall be immediately recertified or replaced with qualified welder.

B. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.

C. Single-Source Responsibility: Use materials and products of one manufacturer whenever possible.

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- D. Materials, components, assemblies, workmanship and installation are to be observed by the Owner's Project Inspector. Work not so inspected is subject to uncovering and replacement.
- E. ICC-Report: Provide roof and floor deck panels which have been evaluated for vertical load capacity and diaphragm shear values by the ICC.
- F. Underwriters Label: Provide metal floor deck units listed in Underwriters Laboratories "Fire Resistance Director", with each deck unit bearing the UL label and marking for specific system detailed.
- G. Factory Mutual Listing: Provide metal roof deck panels which have been evaluated by Factory Mutual (FM) System and are listed in "Factory Mutual Approval Guide" for "Class I" fire-rated construction.
- H. Sheet Steel Welding:
 - 1. General: Welding shall be in compliance with Section 05 1200, Structural Steel Framing, and applicable provisions of CBC, Chapter 2210A.1.1.
 - 2. Welders: Qualified for each light gauge welding process to be used in fabrication and AWS certified.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accordance with manufacturer's written recommendations. Sheets shall be protected from elements in transit.
- B. Deliver undamaged products to job in manufacturer's sealed containers and/or original bundles with tags and labels intact.
- C. Store materials in protected, clean, dry conditions off of ground and in areas so as to not interfere with the progress of the Work.
 - 1. Cut plastic wrap to encourage ventilation.
 - 2. Separate sheets and store decking on dry wood sleepers; slope for positive drainage.
- D. Architect reserves right to reject material that has become damaged because of improper storage.

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1. In addition, Contractor shall replace damaged deck units that are rejected by the Owner's Testing Agency.
2. Rejected deck shall be immediately removed from the jobsite.

1.10 FIELD CONDITIONS

A. Field Measurements:

1. Make and be responsible for all field dimensions necessary for proper fitting and completion of work.
2. Report discrepancies to Contractor before proceeding.
3. The Contractor shall be responsible for all errors of detailing and fabrication and for the correct fitting of all metal decking to each other and to their supports.
4. Provide holes and reinforcement for mechanical and electrical penetrations.

B. Construction Loading:

1. The Contractor shall assume complete responsibility for the loading of composite floor deck due to construction loads.
2. The Contractor shall verify when it is acceptable to place loads on the composite floor deck with the deck supplier, who shall substantiate that the slab deck will not be damaged or have a reduced capacity as a result of the proposed construction loads.
3. The Contractor shall be responsible to repair damage that occurs to the deck due to construction loads.

C. Protection:

1. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
2. In the event of damage, make repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Design deck to section modulus as specified on the Drawings and a maximum vertical deck deflection of $L/240$.
- B. Decks shall conform to the general configuration and dimensions and shall have geometric properties equaling or exceeding those shown.

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C. Sustainable Design:

1. VOC emissions for field-applied paints and coatings must comply with limits specified in Section 01 61 16.

2.02 MANUFACTURERS

A. General:

1. Deck shall be of type and manufacturer as specified on the Drawings or equal meeting or exceeding the ICC approved design values of specified decking.
2. Deck designations used on Drawings refer to ASC Steel Deck designations.

B. Acceptable Manufacturers: ASC Steel Deck, Verco Decking, Inc., or equal.

2.03 MATERIALS

A. Sheet Steel for Decking: Form from sheet steel conforming to ASTM A653/A653M, SS, Grade as standard with manufacturer for each deck Type.

1. Zinc coating thickness shall be G60 minimum. Coating thickness for sheet steel on decks exposed to the exterior shall be G90 minimum.

B. Steel for Closures and Edge Angles: Form from sheet steel conforming to ASTM A653/A653M, SS, Grade 33, with minimum yield strength of 33,000 psi.

1. Zinc coating thickness shall be G60 minimum. Coating thickness on steel sheet exposed to the exterior shall be G90 minimum.

C. Miscellaneous Steel Shapes and Plates: ASTM A36/A36M.

D. Galvanizing-Repair Paint: Minimum 95 percent zinc-dust-content in dried film paint for reglazing welds in galvanized steel; "Z.R.C. Cold Galvanizing Compound" by ZRC Worldwide, or equal.

2.04 CONNECTIONS

A. General:

1. Connections shall be as noted on the Drawings. Alternate connections, when proposed, shall be determined by the Contractor based on the more stringent of the manufacturer's minimum recommendations for the plan configurations and loading or as specified in the Contract Documents.

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2. Connections designed by the Contractor may be made by any method recommended by the manufacturer, except that button punching of side laps shall not be allowed at roof decks unless indicated specifically as being required on the Structural Drawings.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, powder-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Welding Materials: Conform to Table 5.1 of AWS D1.3/D1.3M and Table 3.1 of AWS D1.1/D1.1M with electrodes conforming to AWS A5.1/A5.1M and AWS A5.5.A5.5M. Electrodes shall be as recommended by the manufacturer for the position or other conditions of use.

2.05 DECKING TYPES AND COMPONENTS

- A. General:
 1. Comply with this Specification and the Structural Drawings.
 2. Deck units shall be supplied in lengths to span over at least 2 supports where layout permits.
 3. Deck units shall be provided with either an interlocking side lap or a lapping type side lap.
 4. Conform to general configuration and dimensions and shall have geometric properties equaling or exceeding those shown.
 5. Deck Types not indicated shall comply with this Specification, the Structural Drawings, and conform to general configuration, dimensions, and geometric properties equaling or exceeding those shown.
- B. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31,
 1. Deck Profile: As indicated.
 2. Side Laps: Interlocking seam.

2.06 FABRICATION

- A. General:

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1. Decking shall be designed in accordance with AISI specifications for "North American Specification for the Design of Cold-Formed Steel Structural Members" and in compliance with SDI Design Manual, Publication No. 31 prepared and published by Steel Deck Institute.
 2. Form deck units in lengths to span three or more supports, with flush, telescoped, or nested 2-inch laps at ends and interlocking or nested side laps, of metal thickness, depth, and width as indicated.
 - a. Nominal height: Fluted profile, see Drawings for specific deck profiles.
 - b. Formed sheet width: 24 or 36 inches see Drawings for specific deck profiles.
- B. Provide reinforcing at openings and penetrations in accordance with the Drawings and standard details.
- C. Metal Closure Strips, Plates, and Flashing:
1. Fabricate from specified galvanized steel sheet of not less than 0.045-inch thick (18-gauge) or to match adjacent decking gauge, whichever is heavier.
 2. Closure Strips: Provide for cell raceways and openings between decking and other construction.
 3. Cover Plates:
 - a. Provide where required to cover gaps where deck units abut or change direction, around columns, to cover access holes used for welding, and closures where required.
 - b. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.
 4. Flashing:
 - a. Fabricate continuous flashing for deck units as detailed, or as required, at ends and sides, at openings and at deck perimeter to contain fill.
 - b. Flashing shall be detailed and installed to prevent concrete leakage.
- D. Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with ASTM A780/A780M using specified repair paint.
- E. Where to be exposed and scheduled to be painted, provide galvanized decking with manufacturer's standard 0.3mil water-based gray acrylic primer specially developed to provide superior adhesion to the galvanized steel deck and suitable to receive a field-applied finish coating.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of the work of this Section, carefully inspect and verify that installed work of all other trades is complete to the point where this installation may properly commence.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. In event of discrepancy, immediately notify Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 INSTALLATION

- A. General:
 - 1. Install deck units and accessories in accordance with manufacturer's recommendations, shop drawings, and as specified herein.
 - 2. Deck units shall not be placed on supporting members until all structural steel is completely installed, plumbed and connections are completed.
- B. Deck units shall be placed on supporting steel framework and adjusted to final position before being permanently fastened.
 - 1. Do not stretch or contract side lap interlocks.
 - 2. Each unit shall lap a minimum two inches over supports.
 - 3. Each unit shall be brought to proper bearing on the supporting beams.
 - 4. If the supporting beams are not properly aligned or sufficiently level to permit proper bearing of the steel units, the Contractor shall notify the Architect prior to taking corrective action to insure properly aligned work.
- C. Align deck units for entire length of run of cells and with close alignment between cells at ends of abutting units.
- D. Place deck units flat and square, secured to adjacent framing without warp or deflection.
- E. Do not place deck units on concrete supporting structure until concrete has cured and is dry.

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F. Fastening Deck Units:

1. Deck sheets shall be installed with powder-actuated fasteners as noted on the Structural Drawings.
2. Side laps of deck unit shall be mechanically fastened with “Delta Grip System” by ASC Steel Deck in accordance with ICC Report 1414, or equal, at 18 inches max on center on roofs.
 - a. Minimum diaphragm shear capacity shall be 1000 plf.
3. Weld closure angles and plates with 3/4-inch diameter or 3/8-inch x 1-1/4 inch fusion welds at 18 inches apart.
 - a. End closures of deck units shall be fastened by tack welding not more than 48 inches apart.
 - b. Tack-weld accessory cover plates adequately into place.
4. Weld metal shall penetrate layers of deck material and shall have good fusion to supporting members.
5. Slag may be in place at welds to be covered by concrete. Elsewhere, remove slag to bright metal and touch up all welds and field cut edges with zinc dust-zinc oxide primer.

G. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.

H. Reinforcement at Openings:

1. Provide reinforcement as indicated on the Structural Drawings.
2. Architect shall be immediately notified of openings where supplemental framing is required but is not provided.

I. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units.

J. Closure Strips:

1. Provide metal closure strips at open uncovered ends and edges of roof decking and in voids between decking and other construction.
2. Weld into position to provide a complete decking installation.

K. Hanging Loads:

1. Mechanical equipment or other loads shall not be hung from metal deck unless shown on the Drawings or approved by Architect.

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2. Method of attachment subject to approval.

L. Tolerances:

1. Unless otherwise noted, edge materials shall be field installed to the following minimum tolerances or as required for the installation of the cladding system, whichever is more stringent.
 - a. Edge Location: Plus or minus 1 inch from established building working lines.
 - b. Edge Height: Plus or minus 1/8-inch from established slab thickness.

3.03 FIELD QUALITY CONTROL

- A. Owner will employ a Testing Agency and Inspectors to perform the following and submit reports in accordance with Section 01 4523, Testing and Inspection Services:

1. Review materials and qualification of welders and procedures prior to start of work.
2. Field inspection of metal deck for proper type, gauge, finish, welding quality and erection, including diaphragm connections for size, location and spacing.
3. Layout and field welding of decking to supports and to decking.
4. Periodically inspect welding in progress, and perform final visual inspection of welds.
5. Inspect and test welding of shear connector studs will be as required by Table 1705A.2.1 Item 5 in accordance with AWS D1.1/D1.1M.
6. Testing of end weld studs shall be in accordance with CBC Section 2213A.2.

3.04 CLEANING AND ADJUSTING

- A. After erection, surfaces shall be cleaned and left free of dirt and other contaminants.

1. Where cleaning is required, use solvents, if necessary to provide a surface, which will readily bond with concrete fill and direct-to-steel fireproofing where scheduled.
2. Surfaces to remain exposed in completed construction shall be free from scratches, dents, permanent discolorations and other defects in workmanship and material.
3. Touch-up damaged factory-applied finishes as specified.

- B. Touch-Up Painting:

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1. After decking installation, wire brush, clean, and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.
 2. Repair galvanized coatings on both surfaces of deck with specified galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions at cut edges and locations where coating has been damaged.
- C. Work not in conformance with these Specifications and/or generally accepted standards of the trade, will be deemed defective by the Architect and will be rejected.
1. Work that is defective shall be corrected or replaced. Corrections, redesign, and replacement of defective work shall be approved by the Architect and performed at Contractor's expense.
- D. Remove unused materials, tools, scaffolding and debris from the premises and leave the area broom clean.

END OF SECTION

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SECTION 05 40 00 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: The following light-gauge steel framing supplementing the requirements indicated on the Drawings.
 - 1. Load-bearing metal framing system at exterior walls and other locations indicated on the Drawings and specified.
 - 2. Nonstructural metal framing of vertical and horizontal surfaces.

1.02 RELATED REQUIREMENTS

- A. Section 01 61 16, Volatile Organic Compound (VOC) Restrictions; for VOC limits pertaining to adhesives, sealants, fillers, primers, and coatings.
- B. Section 01 81 13, Sustainable Design Requirements, for CAL-Green general requirements and procedures.
- C. Section 05 12 00, Structural Steel Framing.
- D. Section 05 30 00, Metal Decking.
- E. Section 05 50 00, Metal Fabrications.

1.03 REFERENCES AND STANDARDS

- A. California Building Code (CBC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Green Building Standards Code (CAL Green), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. State of California, Division of the State Architect (DSA):
 - 1. Interpretations of Regulations (IRs):

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- a. IR 19-1: Post- Installed Anchors in Concrete.
- D. American Galvanizers Association (AGA):
- 1. Recommended Practice for Touch-up of Damaged Galvanized Coatings.
- E. American Iron and Steel Institute (AISI):
- 1. S100: North American Specification for the Design of Cold-formed Steel Structural Members.
 - 2. S240: North American Standard for Cold-Formed Steel Structural Framing.
- F. American Welding Society (AWS):
- 1. D1.3/D1.3M: Structural Welding Code – Sheet Steel.
 - 2. A5.1/A5.1M: Specification for Carbon Steel Electrodes.
 - 3. A5.18/A5.18M: Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding.
- G. ASTM International (ASTM):
- 1. A653/A653M: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. A641/A641M: Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - 3. A780/A780M: Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - 4. A1003/A1003M: Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
 - 5. C645: Standard Specification for Nonstructural Steel Framing Members.
 - 6. C754: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 7. C955: Standard Specification for Cold-Formed Steel Structural Framing Members.
 - 8. C1007: Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
 - 9. C1513: Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
 - 10. E119: Test Methods for Fire Tests of Building Construction and Materials.
 - 11. E488/E488M: Standard Test Methods for Strength of Anchors in Concrete Elements.

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12. E814: Standard Test Method for Fire Tests of Penetration Firestop Systems.
13. E1190: Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members.
14. F1941/F1941M: Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric.

H. International Code Council (ICC) Evaluation Service: Evaluation Reports as noted.

I. Steel Stud Manufacturer's Association (SSMA):

1. Product Technical Guide.

J. Underwriters Laboratory (UL):

1. 2079: Test for Fire Resistance of Building Joint Systems.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures:

1. Action Submittals and Informational Submittals shall be submitted in accordance with Section 01 3300, Submittal Procedures.
2. Sustainable Design Submittals shall comply with the additional requirements of Section 01 8113, Sustainable Design Requirements.

1.05 ACTION SUBMITTALS

A. Shop Drawings

1. Show size and locations of framing members in conformance to the criteria shown on the Drawings.
2. Shop and field assembly details, including cuts and connections. Details must reference detail callouts on the construction documents.
3. Type and location of shop and field welds, rivets, bolts, and fastening devices.

B. Product Data:

1. Descriptive data illustrating cold-formed framing system components including fasteners and accessories, including ICC-ES reports.
2. Erection instructions containing sequence of operations.

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- C. Samples: Provide adequate samples of unidentified material to the Owner's Testing Laboratory for testing purposes or if specifically requested.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and installer.
- B. Certification for each welder.
- C. Sustainable Design:
 - 1. General:
 - a. Submit information necessary to establish and document compliance with the California Green Building Standards Code.
 - b. Sustainable design submittals are in addition to other submittals.
 - 2. The following information shall be provided:
 - a. Adhesives and Sealants: Evidence of compliance that products meet maximum VOC content limits specified in Section 01 6116.

1.07 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Company specializing in structural framing components with three years minimum experience.
 - 2. Installer: Company specializing in work of this Section with minimum 3 years' documented experience.
 - 3. Welders: Qualified for light gauge welding in accordance with AWS D1.3/D1.3M.
- B. Regulatory Requirements:
 - 1. Comply with fire-resistance ratings as indicated and as required by governing authorities and codes.
 - 2. Provide materials, accessories, and application procedures listed by an approved testing agency or tested according to ASTM E119 for the type of construction shown.
 - 3. Comply with requirements of CBC, Sections 2201A and 2210A for design and identification of cold-formed steel.
 - 4. Framing system shall conform to ICC-ES Report for stud gauge and spacing for all wall conditions.

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- C. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- D. Single Source Responsibility: Use materials and products of one manufacturer whenever possible.
- E. Materials, components, assemblies, workmanship and installation are to be observed by the Owner's Project Inspector. Work not so inspected is subject to uncovering and replacement.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver undamaged products to job in manufacturer's sealed containers and/or original bundles with tags and labels intact.
- B. Store materials in protected, clean, dry conditions off of ground and in areas so as to not interfere with the progress of the Work.
- C. Transport, store and handle in strict accordance with manufacturer's written recommendations.

1.09 FIELD CONDITIONS

- A. Fireproofing: Where partitions and sprayed-on fireproofing are scheduled in same area, install clips for attachment of metal framing before application of sprayed-on fireproofing.

PART 2 - MATERIALS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Sustainable Design:
 - 1. VOC emissions for field-applied adhesives, sealants, and sealant primers must comply with limits specified in Section 01 6116.

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2.02 MANUFACTURERS

- A. Cold-Formed Metal Framing: CEMCO (California Expanded Metal Products Company), Innovative Steel Systems, ClarkDietrich Building Systems, Steeler, Inc., Scafco Steel Stud Manufacturing Corp., or equal member of the "Steel Stud Manufacturer's Association" (SSMA) and with products meeting all the requirements of ICC-ES ER-3064P.

2.03 LIGHT-GAGE METAL FRAMING

A. General:

1. Structural framing shall comply with ASTM C955.
2. Nonstructural framing shall comply with ASTM C645 using conventional steel studs and tracks.
3. Thickness or gauge identification shall be color coded in accordance with ASTM C955.

- B. Sheet Steel: ASTM A1003/A1003M, Type H, metallic coated of grade and coating weight as follows:

1. 43 Mils (18-gauge) and Lighter: ST33H with minimum yield point of 33 ksi.
2. 54 Mils (16-gauge) and Heavier: ST50H with minimum yield point of 50 ksi.
3. Protective Coating: In accordance with ASTM A653/A653M
 - a. Structural Framing: G90.
 - b. Interior Nonstructural Framing: G40.

C. Studs:

1. General:
 - a. Provide standard punch types designed for screw application of applied materials.
 - b. Punch-outs shall be located along centerline of the webs of the members and will have a minimum center-to-center spacing of 24 inches.
 - c. Punch-outs shall also have a maximum width equal to half the member depth ($d/2$) or 2-1/2 inches, whichever is less, and a maximum length of 4-1/2 inches.
 - d. Provide minimum distance of 10 inches between the end of the member and the near edge of the web punch-out.
2. Thickness: As required to meet specified performance criteria but not less than 33 mils (20 gauge).

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3. Minimum properties for each stud size shall be as specified unless otherwise required to meet the specified performance criteria.
- D. Runners and Tracks: Roll-formed structural channel to match stud width and formed from same thickness and grade of steel as used for studs, unless otherwise noted on Drawings.
1. Floor Tracks: 1-1/2 inch leg height; unless otherwise noted on Drawings.
 2. Top Tracks: Formed from 54 mils (16-gauge) minimum steel with 2-inch legs, unless otherwise noted on Drawings.
 3. Top Track for Deflection Relief: As shown on the Drawings; "MaxTrak 2D (SLP/H)" slotted deflection and drift track by ClarkDietrich Framing Systems, or equal.
 - a. Rated Partitions: When tested in accordance with UL 2079 for cyclical movement and subsequently tested in accordance with the time temperature curve of ASTM E119 and ASTM E814, system shall meet requirements for 1 and 2 hour fire resistance rated construction and to requirements of hose stream resistance.
 - b. Provide sliding clips and other accessories as required for a complete installation.
 4. Finish: As specified for studs.
- E. Rigid Furring Channel, Screwable Type: Hat shaped, cold-formed galvanized steel.
1. At Structural Framing: 43 mils (18-gauge) thickness unless otherwise noted, hat shaped, with plain face to receive screws.
 - a. Depth: As shown.
 2. At Interior Nonstructural Framing: 18 mils (25-gauge) minimum thickness, hat shaped, 7/8-inch deep, with plain or knurled face to receive screws.
 - a. Use 33mils (20-gauge) minimum thickness unless otherwise noted when hanging casework from furring channels.
- F. Resilient Furring Channels: Cold formed galvanized steel asymmetric-shaped channel complying with ASTM C645, minimum 22 mils (0.022-inch) thick, 2-5/8 inches wide, 1/2-inch deep, with a single slotted leg 1-1/2 inch screw flange; ClarkDietrich "RC Deluxe" (RCSD) or equal demonstrating equivalent metal thickness and laboratory acoustical performance.

2.04 ACCESSORIES

- A. General:

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1. Accessories including, but not limited to, clips, web stiffeners, resilient clips, and straps required for a complete and proper installation shall be of the type, size and gauge shown on the Drawings and specified in this Section.
- B. Cold-Rolled Channels (CRC): Minimum 0.053-inch thick (16-gauge) uncoated steel thickness with minimum 1/2-inch wide flanges, and factory-applied, rust-resistant paint that complies with CARB and EPA regulations.
- C. Wire: ASTM A641, Class 1 zinc coating, soft temper.
 1. Hanging Wire: 0.162-inch nominal diameter (8-gauge).
 2. Bracing Wire: Minimum 0.106-inch nominal diameter (12-gauge).
 3. Tie Wire:
 - a. Single Strand: Minimum 0.062-inch nominal diameter (16-gauge).
 - b. Double Strand: Minimum 0.048-inch nominal diameter (18-gauge).

2.05 FASTENERS

- A. Sheet Metal Screws: Steel self-drilling tapping, corrosion resistant, complying with ASTM C1513; "TEKS SELECT" screws" by ITW Buildex; screws in accordance with ICC ESR 3223, or equal.
 1. Screws shall be of sufficient size to insure strength of the connection.
 - a. For Attachment of Two Members with Maximum Material Less than 0.200 Inches: #10- 18x1/2" Tek/2 panhead screws.
 - b. For Two Members with Maximum Material Less than 0.300 Inches: #10- 16x3/4" Tek/3 HWH.
 2. Corrosion-resistant coating shall comply with ASTM F1941.
 3. Head Style and Drive:
 - a. Typical: Pan-head Phillips.
 - b. Provide low-profile head type beneath sheathing and where required to accommodate level application of finish materials.
- B. Powder Driven Fasteners: Low velocity type, suitable for application indicated.
 1. General:
 - a. Do not use for seismically loaded connections where the anchor could be required to resist tension loads.
 - b. Fabricate from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by

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testing in accordance with ASTM E1190 conducted by a qualified independent testing agency.

- c. Pins shall have guide washers to accurately control penetration.
- 2. Types: Hilti Fastening Systems as specified, or equal.
 - a. Anchorage to Concrete: Hilti “X-U”.
 - b. Anchorage to Steel: Hilti “X-U”.
- C. Expansion Anchors:
 - 1. General:
 - a. Fabricate from corrosion-resistant materials with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing in accordance with ASTM E488/E488M conducted by a qualified independent testing agency.
 - b. Anchors shall be CBC and DSA IR 19.1 compliant with a current ICC-ES Report.
 - c. All components of expansion anchor assembly shall be Type 304 stainless steel at exterior work.
 - 2. Types: Hilti Fastening Systems as specified, or equal.
 - a. Drilled-in Concrete Anchors: Hilti “Kwik Bolt TZ”, ICC Report No. ESR-1917.
 - b. Drilled-in Masonry Anchors: Hilti “Kwik Bolt 3” (ICC Report No. ESR-1385).
- D. Welding Electrodes: AWS A5.1/A5.1M E6013 Rods complying with, AWS A5.18/A5.18M.
- E. Touch-up Primer for Galvanized Surfaces: SSPC Paint 20 zinc rich; ZRC Cold Galvanizing Compound by ZRC Worldwide, International Protective Coatings, or equal.

2.06 FABRICATION

- A. Form members to manufacturer's standard shapes meeting design criteria.
- B. Cut right angle connections of framing components to fit squarely against abutting members.
- C. Prime un-galvanized steel to 1.5 mil (0.038 mm) minimum dry film thickness using specified zinc rich primer.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of the work of this Section, carefully inspect and verify that installed work of all other grades is complete to the point where this installation may properly commence.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. In event of discrepancy, immediately notify Contractor. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.02 ERECTION OF COLD-FORMED FRAMING

A. General:

- 1. Framing shall be installed as shown on the Drawings and as follows.
 - a. Structural Framing Requirements of ASTM C1007 and applicable sections of the AISI S240.
 - b. Nonstructural Framing: Requirements of ASTM C754 and referenced SSMA Document.
- 2. Install framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and requirements specified and indicated on the Drawings.
- 3. Fire-Rated Assemblies:
 - a. Comply with UL and local code requirements.
 - b. Use one manufacturer for each assembly, unless otherwise permitted by governing authorities.

B. Tracks:

- 1. Securely anchor tracks to supporting structure, with fasteners specified, to transfer imposed loads properly, but not more than 24 inches on center.
- 2. Provide complete, uniform, and level bearing support for bottom track at each bearing-stud location.
- 3. Install full metal shims below bottom track at stud locations as needed or set bottom track in high-strength grout.
- 4. Abutting or intersecting pieces of track shall be securely anchored to a common structural element or spliced together.

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5. Tracks shall be butted and inter-connected at corners and intersections. Mitters are not permitted.
6. Splices or butt welds shall be used at butt joints in the runner track.
7. Splices in tracks shall be made centered between studs and spliced with a stud section full length between wall studs.

C. Studs:

1. Studs shall sit squarely in top and bottom runner track with firm abutment against track webs.
2. Studs shall be aligned or plumbed and securely fastened to the flanges of both top and bottom track.
3. Space studs as shown and in compliance with UL assembly at rated assemblies.
4. Erect studs plumb with flanges in same direction.
5. Do not splice axial-loaded studs.
6. Track flanges shall overlap studs.
7. Provide deflection allowance in stud track, directly below horizontal building framing for nonstructural framing.

D. Openings:

1. Framed wall openings shall include a properly designed header and multiple studs at each edge of opening.
2. Provide full-height jamb studs in each jamb equal to 1/2 of the studs interrupted by the opening.
3. Space intermediate studs above and below openings at the same spacing as studs each side of the opening.

E. Install diagonal bracing for frame stability and to resist seismic and lateral loads.

1. Diagonal bracing shall not be visible in completed construction.
2. Bracing shall conform to Section C2 of the AISI S100.

F. Blocking:

1. Install blocking in every fourth stud space of the same size and gauge as the wall studs.
2. Provide blocking for installation of finishing materials, fixtures, and trim.
3. Install flat strap or rolled hat channel bridging continuously along each line of blocking with splices centered over and connected to a single piece of blocking.

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- G. Form corners and intersections of partitions with three studs. Provide additional studs to resist vertical loads.
 - H. Join members by welding or with self-drilling, self-tapping screws; do not wire tie framing members.
 - 1. Weld connections by resistance spot or projection welding, fillet welding, or plug welding.
 - 2. Weld in accordance with the latest recommended procedures and practices of the American Welding Society.
 - I. Furred Partitions:
 - 1. Install furring channels at 24 inches on center; level and plumb with steel shims.
 - 2. At concrete backing, fasten with powder driven fasteners at 24 inches on center.
 - 3. Secure to structural steel as specified for metal stud partitions.
 - J. Backing Plates: As indicated on the Drawings.
 - 1. Provide in wall to support wall-mounted items, including but not limited to wall-mounted casework, built-in items, shelving, fixtures, equipment, handrails, grab bars, toilet accessories, and other locations as required by the various Sections of the Work.
 - 2. Attach backing plates by welds or SMS as applicable.
 - 3. Provide supplemental studs as required.
- 3.03 INSTALLATION OF HORIZONTAL FRAMED SURFACES
- A. Install joists and other framing components in accordance with manufacturer's instructions.
 - B. Make provisions for erection stresses. Provide temporary alignment and bracing.
 - C. Place joists at 16 inches on center unless otherwise noted on the Drawings and limit deflection as specified in Part 2.
 - D. Terminate not more than 2 inches from abutting walls. Connect joists to supports using fastener method.
 - E. Set joists parallel and level, with lateral bracing and bridging.

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- F. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.
- G. Provide joist web stiffeners at reaction points.

3.04 FIELD QUALITY CONTROL

- A. Tolerances: Install cold-formed metal framing as shown within the allowable tolerances:
 - 1. Plumbness of Studs: 1/8-inch in 10 feet.
 - 2. Levelness of Joists: 1/8-inch in 10 feet.
 - 3. Stud/Joist Spacing: Plus or minus 1/8-inch.
- B. The Owner's Testing Agency will:
 - 1. Provide inspection of welding, including prior fit-up, welding equipment, welding quality, and welder certification, in accordance with the CBC.
 - 2. Provide inspection during installation as required in order to establish conformity of work requirements.
- C. Maintain partitions in fully open position completely covered with protective materials until final acceptance by the Architect.

3.05 PROTECTION

- A. Protect work and materials of this Section prior to and during installation and protect the installed work and materials of other trades.
- B. In the event of damage, make repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

3.06 ADJUSTING

- A. Touch up field abrasions and welds and repair other damaged galvanized coating of structural framing with specified repair paint in accordance with ASTM A780/A780M, AGA publication, "Recommended Practice for Touch-up of Damaged Galvanized Coatings," and manufacturer's recommendations for application of repair paint.

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- B. Work not in conformance with these Specifications and/or generally accepted standards of the trade, will be deemed defective by the Architect and will be rejected.
 - 1. Work that is defective shall be corrected.
 - 2. Corrections, redesign, and replacement of defective work shall be approved by the Architect and performed at Contractor's expense.
 - 3. Straightening of materials, if necessary, shall be done by a process and in a manner that will not injure the materials, and which is approved by the Architect. Sharp kinks or bends shall be cause for rejection. Heating will not be allowed.
- C. If defects or damaged work cannot be corrected in the field, the material shall be returned to the shop or new parts furnished, as the Architect directs; the Contractor shall replace all such work at his own expense.

3.07 FASTENING SCHEDULE

- A. Refer to information included in the Drawings.

END OF SECTION

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SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Miscellaneous metal items indicated and specified, or otherwise necessary for completion of the work. Work of this section includes, but is not limited to, the following:
 - 1. Ferrous and non-ferrous metalwork detailed on the drawings as a component part of other assemblies, but not specified elsewhere.
 - 2. Miscellaneous steel framing and supports including:
 - a. Overhead doors.
 - b. Mechanical and electrical equipment.
 - c. Applications where framing and supports are not specified in other Sections.

1.02 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.03 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Slotted channel framing.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.04 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

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1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.05 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.06 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal fabrications, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
 - 1. Structural Performance, General: Design metal fabrications to withstand the effects of gravity loads within limits and under conditions indicated.
 - 2. Seismic Performance: Provide metal fabrications capable of withstanding the effects of earthquake motions determined according to ASCE/SEI 7.
 - 3. Structural Performance of Slotted Channel Framing: Slotted Channel Framing shall withstand the effects of loads and stresses applied by equipment being supported.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

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- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Manufacturers: Subject to compliance with requirements, acceptable manufacturers include, but are not limited to, the following:
 - a. Unistrut
 - 2. Size of Channels: 1-5/8 by 1-5/8 inches.
 - 3. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with G90 coating; 0.108-inch nominal thickness.

2.03 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- F. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- G. Post-Installed Anchors: Torque-controlled expansion anchors.

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1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.04 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Division 09 "Painting" Sections.
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- C. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.05 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

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- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.06 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous exterior framing and supports.
- D. Prime miscellaneous framing and supports where indicated.

2.07 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

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PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.02 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for overhead doors securely to, and rigidly brace from, building structure.

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3.03 REPAIRS

- A. Galvanized Surfaces: Clean field welds and damaged areas and repair galvanizing to comply with ASTM A 780/A 780M, in accordance with Annex A1 zinc solder or Annex A3 metallizing. Repair method in accordance with Annex A2 galvanizing repair paint not permitted.

END OF SECTION

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SECTION 06 41 00 - ARCHITECTURAL WOOD CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad cabinets.
 - 2. Cabinet hardware and accessories.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For architectural cabinets.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for items installed in architectural cabinets.
- C. Samples for Verification: For the following:
 - 1. Plastic Laminates: 12 by 12 inches, for each type, color, pattern, and surface finish required.
 - a. Provide one sample applied to core material with specified edge material applied to one edge.
 - 2. Thermally Fused Laminate (TFL) Panels: 12 by 12 inches, for each color, pattern, and surface finish.
 - a. Provide edge banding on one edge.
 - 3. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.04 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:

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1. Documentation for composite wood products, indicating compliance with emissions testing or certification.

1.05 QUALITY ASSURANCE

- A. Quality Standard: Unless otherwise indicated, comply with WI's North American Architectural Woodwork Standards (NAAWS) for grades indicated for construction, finishes, installation, and other requirements.
 1. Where the Contract Documents contain requirements that are more stringent than the referenced quality standard, comply with requirements of the Contract Documents in addition to those of the referenced quality standard.
- B. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- C. Installer Qualifications: Manufacturer of products.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.01 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 1. Composite Wood Products:

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- a. Formaldehyde emissions testing or certification.

2.02 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Architectural Woodwork Standards Grade: Custom.
- B. Type of Construction: As indicated on drawings.
- C. Door and Drawer-Front Style: As indicated on drawings overlay.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 - 1. Basis-of-Design Products: As indicated on Drawings.
- E. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade VGS.
 - 4. Edges: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish.
 - 5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- F. Materials for Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - a. Edges of Plastic-Laminate Shelves: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish .
 - b. Edges of Thermally Fused Laminate Panel Shelves: PVC or polyester edge banding.
 - c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - 2. Drawer Sides and Backs: Thermally fused laminate panels with PVC or polyester edge banding.
 - 3. Drawer Bottoms: Thermally fused laminate panels.
- G. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.

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- J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated on drawings.

2.03 WOOD MATERIALS

- A. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
 2. Particleboard (Medium Density): ANSI A208.1, Grade M-2.
 3. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
 4. Thermally Fused Laminate (TFL) Panels: MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.04 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 00 "Door Hardware."
- B. Butt Hinges: 2-3/4-inch, five-knuckle steel hinges made from 0.095-inch- thick metal, and as follows:
1. Semiconcealed Hinges for Flush Doors: ANSI/BHMA A156.9, B01361.
 2. Semiconcealed Hinges for Overlay Doors: ANSI/BHMA A156.9, B01521.
- C. Back-Mounted Pulls: ANSI/BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid stainless steel, 1-13/32 inch projection, 3/8 inch in diameter.
1. Basis-of-Design Product: Doug Mockett & Company, Inc.; DP57 Series.
 2. Length: 4-5/32 inches.
- E. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.
- F. Adjustable Shelf Standards and Supports: ANSI/BHMA A156.9, B04071; with shelf rests, B04081.
- G. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.
- H. Drawer Slides: BHMA A156.9, and as follows:
1. General Purpose Drawer Slides: Grade 1HD-100, side mounted; full-extension type; hold-in detent; progressive movement; zinc-plated steel ball-bearing slides.
 - a. Basis-of-Design Product: Accuride Model 7432.
 2. File Drawer Slides: Grade 1HD-100; for drawers up to 24 inches wide.
 - a. Basis-of-Design Product: Accuride Model 4034.

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- 3. File Drawer Slides: Grade 1HD-200; for drawers more 24 inches wide.
 - a. Basis-of-Design Product: Accuride Model 3640A.
 - I. Door Locks: ANSI/BHMA A156.11, E07121.
 - J. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
 - K. Grommets for Cable Passage through Countertops: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide "SG series" by Doug Mockett & Company, Inc.
 - 2. Color: As selected by Architect from manufacturer's full range.
 - L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Chromium Plated: ANSI/BHMA 626 for brass or bronze base; ANSI/BHMA 652 for steel base.
 - 2. Bright Chromium Plated: ANSI/BHMA 625 for brass or bronze base; ANSI/BHMA 651 for steel base.
 - 3. Satin Stainless Steel: ANSI/BHMA 630.
 - M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.
- 2.05 MISCELLANEOUS MATERIALS
- A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- 2.06 FABRICATION
- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated. Ease edges and corners to 1/16-inch radius unless otherwise indicated.
 - B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

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PART 3 - EXECUTION

3.01 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.02 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with cabinet surface.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces. Touch up finishes to restore damaged or soiled areas.

END OF SECTION

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SECTION 06 64 00 - PLASTIC PANELING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Plastic sheet paneling.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

1.03 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for adhesives and sealants, indicating VOC content.

1.04 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Crane Composites, Inc.
 - 2. Marlite.
 - 3. Nudo Products, Inc.
- B. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

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2.02 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Adhesives:
 - a. VOC content limits for field applications.
 - 2. Sealants:
 - a. VOC content limits for field applications.

2.03 PLASTIC SHEET PANELING

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319.
 - 1. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Nominal Thickness: Not less than 0.09 inch.
 - 3. Surface Finish: As indicated on Drawings.
 - 4. Color: As indicated on Drawings.

2.04 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, and caps as needed to conceal edges.
 - 1. Color: Match panels .
- B. Adhesive: As recommended by plastic paneling manufacturer.
- C. Sealant: Mildew-resistant, single-component, neutral-curing or acid-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.02 PREPARATION

- A. Remove wallpaper, vinyl wall covering, loose or soluble paint, and other materials that might interfere with adhesive bond.
- B. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.
- C. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- D. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- E. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.
 - 1. Mark plumb lines on substrate at trim accessory locations for accurate installation.
 - 2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.03 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive.
- D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION

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SECTION 07 05 43 - CLADDING SUPPORT SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Metal cladding support systems.
- B. Related Sections:
 - 1. Section 07 21 00 "Thermal Insulation" for continuous (exterior) insulation.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of support system and accessory.
- B. Shop Drawings:
 - 1. Include installation layout for each cladding support system, each cladding type supported, and for each backup wall condition.

1.03 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, tests performed by a qualified testing agency.
- B. Energy Performance Test Reports: For each product and system, tests performed by a qualified testing agency.
- C. Delegated-Design Submittal: For cladding support systems, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.04 COORDINATION

- A. Coordinate cladding support system installation with cladding systems, continuous (exterior) insulation, air and weather barrier, flashing, trim, and other adjoining work.

1.05 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cladding support systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.

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- b. Deterioration of metals and other materials beyond normal weathering.
- 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Quality Requirements," to design cladding support systems.
- B. Structural Performance: Provide systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Cladding Deflection Limits: For wind loads, space support elements and subframing as required to meet performance requirements indicated for cladding types being supported.
- C. Seismic Performance: Cladding support systems with cladding types supported shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- D. Energy Performance: Cladding support system with cladding types supported shall have clear field U-factor of not more than the following, determined according to 3D thermal modeling in accordance with ASHRAE 1365-RP, or laboratory testing in accordance with ASTM C1363:
 - 1. Thermal Transmittance (U-factor): U-0.080.
- E. Fire Propagation Characteristics: Where required by building code for wall assemblies indicated, passes NFPA 285 testing as part of an approved assembly.

2.02 METAL CLADDING SUPPORT SYSTEMS

- A. Thermally Isolated Steel Z-Furring: System consisting of a hollow thermal isolation strip and a galvanized steel z-girt with a punched web .
 - 1. Basis of Design Product: Knight Wall Systems; Thermazee.
 - 2. Material: ASTM A1046, Structural Steel (SS), Grade B, 50ksi yield, coating designation ZM40.
 - 3. Minimum Base-Metal Thickness: As required to meet performance requirements.
 - 4. Z-Girt Depth: 1.5.
 - 5. Finish: As selected by Architect from manufacturer's full range.

2.03 MISCELLANEOUS MATERIALS

- A. Metal Subframing: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide sections as required for support and alignment of cladding system.

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- B. Fasteners: Type and size as recommended by cladding support system manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance of the Work.
 - 1. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required.
 - 2. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Install rails, subframing, and other miscellaneous support members and anchorages according to cladding support manufacturer's written recommendations.

3.03 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align cladding units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

END OF SECTION

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SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Insulation in cavities formed by framing members.
 - 2. Exterior continuous insulation.
 - 3. Miscellaneous rigid and semi-rigid board insulation applications.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.
 - 2. Division 07 Sections: For insulation specified as part of roofing and horizontal waterproofing assemblies.
 - 3. Section 09 81 00 "Acoustic Insulation" for sound attenuation insulation.
 - 4. Division 22 and 23 Sections: For pipe and duct insulation.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.03 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for insulation, indicating compliance with emissions testing or certification.
 - 2. Documentation for adhesives, indicating VOC content.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.04 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

PART 2 - PRODUCTS

2.01 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Insulation:

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- a. VOC emissions testing or certification.
- 2. Adhesives:
 - a. VOC content limits for field applications.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Provide exterior wall assemblies with foam plastic insulation with the following fire-test-response characteristics, as determined by testing identical panels and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
 - 1. Intermediate-Scale Multistory Fire Test: Tested mockup, representative of completed wall assembly of which foam plastic continuous insulation is a part, complies with NFPA 285 for test method and required fire-test-response characteristics of exterior non-load-bearing wall assemblies.

2.03 INSULATION IN CAVITIES FORMED BY FRAMING MEMBERS

- A. Unfaced, Glass-Fiber Blanket Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
 - 1. Locations: Where indicated, and as follows:
 - a. Cavities formed with steel stud framing members.

2.04 EXTERIOR CONTINUOUS INSULATION

- A. Unfaced, Semi-Rigid Mineral-Wool Board Insulation: ASTM C612, Type IVA or IVB; with maximum flame-spread and smoke-developed indexes of 0; and of the following nominal density and thermal resistivity:
 - 1. Nominal density of 4.5 lb/cu. ft., thermal resistivity of 4.2 deg F x h x sq. ft./Btu x in. at 75 deg F.
 - 2. Locations: Where indicated, and as follows:
 - a. Continuous insulation between exterior cladding and sheathing.
 - 3. Product: Provide one of the following:
 - a. Owens Corning; Thermafiber RainBarrier.
 - b. Rockwool; CavityRock.
- B. Fasteners:
 - 1. Cavity-Wall Fasteners: Corrosion-resistant fasteners recommended by insulation manufacturer for intended use consisting of 1-3/4 inch diameter plastic cap, and fastener indicated below.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide the following:
 - 1) Wind-Lock Corporation; ci-Lock Steel Series Selection.

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2.05 MISCELLANEOUS RIGID AND SEMI-RIGID BOARD INSULATION

- A. Faced, Semi-Rigid Mineral Wool Board Insulation: ASTM C612, Types IA, IB, II, III, or IVA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene, vapor-retarding, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; and of the following minimum nominal density and thermal resistivity:
1. Nominal density of 3.5 lb/cu. ft. minimum, thermal resistivity of 4.2 deg F x h x sq. ft./Btu x in. at 75 deg F minimum.
 2. Facing: White Aluminum FSP.
 3. Locations: Where indicated, and as follows:
 - a. Between conditioned and unconditioned space at horizontal assemblies.
 4. Basis-of-Design Product: Owens Corning; Thermafiber VersaBoard 35.
- B. Fasteners:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AGM Industries, Inc.
 - b. Gemco.
 2. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
 - a. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - b. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation indicated.
 3. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
 4. Dome Caps: Designed to protect ends of insulation-retaining washers in locations where exposed to view or human contact.

2.06 MISCELLANEOUS ACCESSORIES

- A. Board Insulating Facing Tape: Unprinted pressure-sensitive tape of type recommended by manufacturer for sealing joints between exposed, faced board insulation.
1. Color: White.
- B. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AGM Industries, Inc.; HA19-Z Insulation Hanger Adhesive.
 - b. Boss Products; 180 Multi Seal Insulation Anchor Adhesive.

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PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.02 INSTALLATION OF EXTERIOR CONTINUOUS INSULATION

- A. Mineral-Wool Board Insulation: Install insulation fasteners 4 inches from each corner of board insulation, at center of board, and as recommended by manufacturer.
 - 1. Fit courses of insulation between obstructions, with edges butted tightly in both directions, and with faces flush.
 - 2. Press units firmly against inside substrates.

3.03 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Install blankets according to ASTM C1320.
 - 2. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 3. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 4. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

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5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced glass fiber blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..

3.04 INSTALLATION MISCELLANEOUS RIGID AND SEMI-RIGID BOARD INSULATION

- A. Install insulation on substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for substrate type, insulation type, thickness, and application indicated.
2. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
3. Where insulation will be exposed to view or human contact, apply dome caps to tips of spindles.
4. Seal joints between board insulation and adjacent construction with board insulation facing tape to form a continuous air barrier preventing interior air from infiltrating the insulation board.

END OF SECTION

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SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Fluid-applied weather barriers.
- B. Related Sections:
 - 1. 076500 - Flexible Flashing: For flexible flashings not part of weather barrier assemblies.

1.02 DEFINITIONS

- A. Weather Barrier: Material within the exterior envelope assembly that performs as a water-resistive and air barrier, primarily to mitigate the consequences of bulk water intrusion through cladding systems and air movement through assemblies.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For weather barrier assemblies.
 - 1. Show locations and extent of weather barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1.04 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports: From manufacturer's technical personnel.
- B. Sample Warranties.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by weather barrier system manufacturer to install manufacturer's product.

1.06 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of weather barriers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. General: Weather barrier shall be capable of performing as a continuous barrier to air, water, and perform as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Weather barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Weather Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E2357.
- C. Fluid-Applied Flashing Performance: Fluid-applied flashing shall meet minimum performance requirements when tested according to AAMA 714.

2.02 FLUID-APPLIED WEATHER BARRIERS

- A. Fluid-Applied, Vapor-Permeable Membrane: Synthetic polymer membrane.
 - 1. VOC Content: Complying with VOC content limits of authorities having jurisdiction.
 - 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Synthetic Polymer Membrane:
 - 1) DuPont (E. I. du Pont de Nemours and Company); Tyvek Fluid Applied WB+.
 - 3. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/ sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
 - b. Vapor Permeance: Minimum 20 perms; ASTM E 96, Procedure B Water Method.
 - c. Ultimate Elongation: Minimum 300percent; ASTM D 412, Die C.

2.03 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by weather barrier manufacturer to produce a complete weather barrier assembly and compatible with weather barrier membrane.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

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3.02 SURFACE PREPARATION

- A. Mask off adjoining surfaces not covered by weather barrier to prevent spillage and overspray affecting other construction.
- B. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- C. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- D. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

3.03 FLUID-APPLIED WEATHER BARRIER INSTALLATION

- A. General: Install fluid-applied membrane weather barrier and accessory materials according to weather barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous weather barrier.
- B. Apply primer to substrates when required by weather barrier manufacturer in accordance with manufacturer's instructions.
 - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Wall Openings: Prepare concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors.
- D. Seal top of through-wall flashings to weather barrier.
- E. Fluid-Applied Membrane Material: Apply a continuous unbroken weather barrier membrane to substrates with total dry film thickness as recommended in writing by manufacturer to meet performance requirements, applied in one or more equal coats. Apply weather barrier membrane in full contact around protrusions such as masonry ties.
- F. Do not cover weather barrier until it has been inspected by manufacturer's technical personnel.
- G. Correct deficiencies in or remove weather barrier that does not comply with requirements; repair substrates and reapply weather barrier components.

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3.04 FIELD QUALITY CONTROL

- A. Inspections: Arrange for weather barrier system manufacturer's technical personnel to inspect weather barrier installation on completion.
- B. Repair or remove and replace components of weather barrier system where inspections indicate that they do not comply with specified requirements.

3.05 CLEANING AND PROTECTION

- A. Protect weather barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect weather barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace weather barrier exposed for more than days allowed by manufacturer.
 - 2. Protect weather barrier from contact with incompatible materials and sealants not approved by weather barrier manufacturer.
- B. Remove masking materials after installation.

END OF SECTION

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SECTION 07 26 00 - VAPOR RETARDERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Underslab vapor retarders.
- B. Related Sections:
 - 1. Division 31 Section "Earth Moving" for drainage fill and subbase under slabs-on-grade.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.03 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.01 UNDERSLAB VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fortifiber Building Systems Group; Moistop Ultra.
 - b. Insulation Solutions, Inc.; Viper VaporCheck.
 - c. Meadows, W. R., Inc.; Perminator.
 - d. Raven Industries Inc.; Vapor Block.
 - e. Stego Industries, LLC; Stego Wrap.

2.02 ACCESSORIES

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

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PART 3 - EXECUTION

3.01 PREPARATION

- A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

3.02 INSTALLATION OF UNDERSLAB VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.03 PROTECTION

- A. Protect vapor retarders from damage until concealed by permanent construction.

END OF SECTION

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SECTION 07 41 13.16 - STANDING-SEAM METAL ROOFING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Standing-seam metal roofing system including the following:
 - 1. Formed metal roofing panels.
 - 2. Underlayment.
 - 3. Roof insulation.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.03 DEFINITIONS

- A. Metal Roofing System: Metal roof panels, attachment system components, underlayment, thermal insulation and accessories necessary for a complete weathertight roofing system.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, insulation, and accessories; and special details and the following:
 - 1. Underlayment terminations.
 - 2. Tie-in with adjoining air barrier.
- C. Samples: For each type of metal panel indicated.

1.05 INFORMATIONAL SUBMITTALS

- A. Warranties: Sample of special warranties.

1.06 CLOSEOUT SUBMITTALS

- A. Maintenance data.

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1.07 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.08 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Solar Reflectance Index: Not less than 23 when calculated according to ASTM E1980, based on testing identical products by a qualified testing agency.
- B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- C. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E1680 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- D. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E1646 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- E. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E2140.

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- F. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
 - 1. Uplift Rating: UL 90.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.02 STANDING-SEAM METAL ROOF PANELS

- A. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
 - 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1514.
- B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Metal Sales; Magna-Loc 180, or comparable product by one of the following:
 - a. AEP Span; A BlueScope Steel Company.
 - b. CENTRIA Architectural Systems.
 - 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Nominal Thickness: 0.022 inch .
 - b. Exterior Finish: Two-coat fluoropolymer .
 - c. Color: As selected by Architect from manufacturer's full range.
 - 3. Clips: Two-piece floating to accommodate thermal movement.
 - a. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
 - 4. Joint Type: As standard with manufacturer.
 - 5. Panel Coverage: 16 inches.
 - 6. Panel Height: 2.0 inches.

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2.03 FIELD-INSTALLED METAL ROOFING INSULATION

- A. Unfaced, Polyisocyanurate Board Insulation: ASTM C 591, Type II, compressive strength of 35 psi, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, based on tests performed.

2.04 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 milsthick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. Titanium PSU30; Owens Corning.
 - b. Blueskin PE200HT; Henry.
 - c. Grace Ultra; GCP Applied Technologies.
 - d. Jiffy Seal Ice and Water Guard HT; Protecto Wrap Company.
 - 2. Thermal Stability: Stable after testing at 240 deg F; ASTM D1970.
 - 3. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970.
- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.05 SUBSTRATE BOARDS

- A. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M; Type X, 5/8 inch.
- B. Substrate-Board Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FMG 4470, designed for fastening substrate board to substrate.

2.06 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Pressure Plates: Provide metal pressure plates beneath clips, fabricated from material recommended by manufacturer.

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4. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- C. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- D. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
 2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.07 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.08 FINISHES

- A. Panels and Accessories:
 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
 2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

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PART 3 - EXECUTION

3.01 PREPARATION

- A. Substrate Board: Install substrate boards over roof deck on entire roof surface. Attach with substrate-board fasteners.
 - 1. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

3.02 ROOFING INSULATION INSTALLATION

- A. Board Insulation: Place insulation in thickness indicated to cover entire roof.
- B. Install roof panel clips and pressure plates over insulation in accordance with manufacturer's instructions.

3.03 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
 - 1. Apply over the entire roof surface.
- B. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 07 62 00 "Sheet Metal Flashing and Trim."

3.04 INSTALLATION OF STANDING SEAM METAL ROOF PANELS

- A. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 4. Watertight Installation:
 - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.

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- b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
 - B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- 3.05 CLEANING AND PROTECTION
- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
 - B. Touch up minor scratches and abrasions in finishes in accordance with finish manufacturer's instructions.

END OF SECTION

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SECTION 07 42 13.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Concealed-fastener, lap-seam metal wall panels.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:
 - 1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.03 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

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1.05 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

1.07 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.08 COORDINATION

- A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.09 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

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1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 1. Wind Loads: As indicated on Drawings.
 2. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.02 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Wide-Reveal-Joint, Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and a stepped profile between panel edges, resulting in a wide reveal joint between panels.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Metal Sales Manufacturing Corporation; EM15-1266or comparable product by one of the following:
 - a. CENTRIA, a Nucor Brand.
 - b. MBCI; Cornerstone Building Brands.
 - c. Morin - A Kingspan Group Company.
 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Nominal Thickness: 0.029 inch (22 ga.).
 - b. Exterior Finish: Two-coat fluoropolymer.

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- c. Color: As selected by Architect from manufacturer's full range.
- 3. Panel Coverage: 12 inches.
- 4. Panel Height: 1.5 inches.

2.03 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

2.04 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

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- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.05 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.03 INSTALLATION

- A. Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving metal panels.
 - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as metal panel work proceeds.
 - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.

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8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
1. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 2. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 3. Flash and seal panels with weather closures at perimeter of all openings.
- E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
- F. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

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3.04 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 07 60 00 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Formed Products:
 - a. Formed sheet metal fabrications.
- B. Related Sections:
 - 1. Section 07 65 00 "Flexible Flashing" for flexible flashing membranes.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation layouts of flashing and sheet metal, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
 - 1. Include details for forming, joining, supporting, and securing flashing and sheet metal, including pattern of seams, termination points, fixed points, expansion joints, expansion-joint covers, edge conditions, special conditions, and connections to adjoining work.
 - 2. Include identification of material, thickness, weight, and finish for each item.
- C. Samples: For each exposed product and for each finish specified.

1.03 INFORMATIONAL SUBMITTALS

- A. Maintenance data.

1.04 QUALITY ASSURANCE

- A. Flashing and Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

PART 2 - PRODUCTS

2.01 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

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- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
 - 1. Exposed Coil-Coated Finishes: Fluoropolymer.
 - a. Color: As indicated by manufacturer's designations.
- C. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.
 - 2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.
 - 3. Exposed Finish: Fluoropolymer.
 - a. Color: As indicated by manufacturer's designations.

2.02 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete flashing and sheet metal installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Metallic-Coated Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in flashing and sheet metal and remain watertight.

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- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.03 FABRICATION, GENERAL

- A. General: Custom fabricate flashing and sheet metal to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form flashing and sheet metal without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- C. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- E. Painted or Coated Sheet Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

2.04 SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.
 - 1. Expansion Joints: Lap type.
 - 2. Accessories: Wire ball downspout strainer.
 - 3. Gutters with Girth up to 15 Inches: Fabricate from one of the following materials:
 - a. Aluminum: 0.032 inch thick.
 - b. Galvanized Steel: 0.022 inch thick.

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- c. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.
- B. Downspouts: Fabricate downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
 - 1. Fabricate from one of the following materials:
 - a. Galvanized Steel: 0.040 inch (20 ga.) thick.
- C. Counterflashing: Fabricate from the following materials:
 - 1. Galvanized Steel: 0.040 inch (20 ga.) thick.
- D. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch- high, end dams. Fabricate from one of the following materials:
 - 1. Galvanized Steel: 0.040 inch (20 ga.) thick.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. General: Anchor flashing and sheet metal and other components of the Work securely in place, with provisions for thermal and structural movement so that completed flashing and sheet metal shall not rattle, leak, or loosen, and shall remain watertight. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete flashing and sheet metal system.
 - 1. Install flashing and sheet metal true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install flashing and sheet metal to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 - 4. Install exposed flashing and sheet metal without excessive oil canning, buckling, and tool marks.
 - 5. Install sealant tape where indicated.
 - 6. Torch cutting of flashing and sheet metal is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
 - 1. Coat back side of stainless-steel flashing and sheet metal with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

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- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Seal joints as shown and as required for watertight construction.

3.02 SHEET METAL FLASHING INSTALLATION

- A. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
 - 1. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.
- B. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant.
- D. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.03 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Remove temporary protective coverings and strippable films as flashing and sheet metal are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION

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SECTION 07 65 00 - FLEXIBLE FLASHING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Self-adhering flexible flashing.
 - 2. Liquid-applied flexible flashing.
- B. Related Sections:
 - 1. Section 07 25 00 "Weather Barriers" for flexible flashings integral to weather barrier assemblies.
 - 2. Section 07 60 00 "Flashing and Sheet Metal" for sheet metal flashing.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation layouts of flashing, including plans, elevations, expansion-joint locations, and keyed details.
 - 1. Include details for forming, joining, supporting, and securing flashing, including termination points, expansion joints, edge conditions, special conditions, and connections to adjoining work.
 - 2. Include identification of material and thickness for each item.
- C. Samples: For each exposed product and for each finish specified.

1.03 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of flexible flashing product, for tests performed by a qualified testing agency.
- B. Maintenance data.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Flexible Flashing Performance, General: Flexible flashing seals with adjacent construction shall be capable of performing as a continuous air and water barrier. Flexible flashing shall be capable of accommodating substrate movement, construction material changes, penetrations, and transitions without deterioration, water penetration under pressure differential, and air leakage exceeding specified limits.

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- B. Self-Adhering Flexible Flashing Performance: Self-adhering flexible flashing shall meet minimum performance requirements when tested according to AAMA 711.

2.02 SELF-ADHERING FLEXIBLE FLASHING

- A. Self-Adhering Flexible Flashing: Cold-applied flashing tape, a minimum of 30 mils thick, consisting of a polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing, in factory cut widths.
1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. GCP Applied Technologies; Perm-A-Barrier Wall Flashing.
 - b. Henry; Blueskin TWF.
 - c. W.R. Meadows; Air-Shield Thru-Wall Flashing.
 2. Locations: Transition flashing at sheathing, metal flashings, and other locations indicated.
- B. High Temperature Self-Adhering Membrane Flashing: Cold-applied flashing tape, a minimum of 30 mils thick, consisting of a polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing, in factory cut widths.
1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Protecto Wrap: Sill Pan Flash Butyl.
 - b. Henry; FortiFlash Butyl Waterproof Flashing Membrane.
 2. Thermal Stability: Stable after testing at 240 deg F; ASTM D1970.
 3. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970.
 4. Locations:
 - a. Beneath metal copings.
 - b. Other locations indicated.
- C. Foil-Faced Self-Adhering Membrane Flashing: Cold-applied flashing tape, a minimum of 30 mils thick, consisting of a glass scrim reinforced aluminum foil laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing, in factory cut widths.
1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Henry; Metal Clad.
 - b. Polyguard; Aluma-Flash.
 - c. W.R. Meadows; Air-Shield Aluminum Flashing.
 - d. Karnak; 550 Patch-N-Go.
 - e. Soprema; Soprasolin HD.
 - f. GCP
 2. Locations:
 - a. Glazed framing assemblies.
 - b. Wall penetrations and wall openings.

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c. Other locations indicated.

D. Liquid Mastic: Liquid mastic recommended by flashing manufacturer.

2.03 LIQUID-APPLIED FLEXIBLE FLASHING

A. Multicomponent, Reinforced, Polymethyl Methacrylate (PMMA) Flashing:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Kemper System Kemperol AC Speed FR or comparable product by one of the following:
 - a. Soprema.
 - b. Siplast.
2. Membrane-Reinforcing Fabric: Manufacturer's recommended polyester fabric reinforcement.
3. Thickness: 90 mils, minimum.
4. Primer: As recommended by manufacturer for substrates indicated.
5. Finish Coat: Manufacturer's standard finish coat of type required and recommended for application over PMMA flashing membrane.
 - a. Color: As selected by Architect from manufacturer's full range.
6. Locations:
 - a. Door sills.
 - b. Rough openings.
 - c. Transitions at waterproofing membranes.
 - d. Other locations indicated.

2.04 MISCELLANEOUS MATERIALS

A. General: Provide materials required for complete flashing installation as recommended by manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. General: Install flashing securely in place, with provisions for thermal and structural movement so that completed flashing shall not leak and shall remain watertight.
1. Install flashing and sheet metal true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install flashing to fit substrates and conform to geometry of area receiving flashing resulting in watertight performance.

3.02 SELF-ADHERING FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
1. Clean, prepare, prime, and treat substrates according to manufacturer's written instructions.

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2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
3. Apply in a shingled manner to shed water without interception by any exposed sheet edges.
4. Roll firmly to enhance adhesion to substrates.

3.03 LIQUID-APPLIED FLEXIBLE FLASHING INSTALLATION

- A. Apply flashing where indicated to comply with manufacturer's written instructions.
 1. Clean, prepare, prime, and treat substrates according to manufacturer's written instructions.
 2. Mix materials and apply flashing by roller, notched squeegee, trowel, or other suitable application method.
 3. Apply first coat of liquid-applied flashing, embed membrane-reinforcing fabric, and apply second coat of liquid-applied flashing to completely saturate reinforcing fabric and to obtain a seamless reinforced flashing membrane free of entrapped gases and pinholes, with an average dry film total thickness of 90 mils.
 4. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
 5. Apply masking tape to each side of joint, outside of area to be covered by flashing system.

3.04 CLEANING AND PROTECTION

- A. Protect flexible flashings from damage during application and remainder of construction period, according to manufacturer's written instructions.
 1. Protect flexible flashings from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace flexible flashing materials according to manufacturer's written instructions.
 2. Protect flexible flashings from contact with incompatible materials and sealants not approved by manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.
- C. Remove masking materials after installation.

END OF SECTION

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SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Sealant and backing materials.
 - 2. Acoustical sealants.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.03 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for sealants, indicating VOC content.
- B. Product Test Reports: For each kind of joint sealant.
- C. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
- D. Sample Warranties: For special warranties.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.

1.05 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

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1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with stone or masonry substrates.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
6. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

1.06 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.07 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period:
 - a. Silicone Sealants: 20 years from date of Substantial Completion.
 - b. All Other Sealants: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:

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1. Sealants:
 - a. VOC content limits for field applications.

2.02 SOURCE LIMITATIONS

- A. Obtain joint sealants from single manufacturer for each sealant type.

2.03 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- C. Nonstaining Joint Sealants: Where sealants are indicated to be nonstaining, provide products that exhibit no staining of substrates when tested according to ASTM C1248.
- D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with the following public health and safety requirements:
 1. Sealant is certified for compliance with NSF standards for end-use application indicated.
 2. Washed and cured sealant complies with the FDA's regulations for use in areas that come in contact with food.
- E. Mildew-Resistant Joint Sealants: Where sealants are indicated to be mildew-resistant, provide products formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- F. Colors of Exposed Joint Sealants: Custom colors as directed by Architect.

2.04 JOINT SEALANTS

- A. Silicone: Single-component, nonsag, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
 1. Joint Locations: Exterior joints in vertical surfaces and horizontal nontraffic surfaces, and as follows:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between metal panels.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors, windows, glazed framing systems, and louvers.

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- e. Other joints as indicated on Drawings.
- 2. Basis-of-Design Product: The Dow Chemical Company; DowSil 790, 791, or 795 at Contractor's option.
 - a. Subject to compliance with requirements, manufacturers offering comparable products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) GE Construction Sealants; Momentive Performance Materials Inc.
 - 2) Pecora Corporation.
 - 3) Sika Corporation; Joint Sealants.
 - 4) Tremco Incorporated.
- B. Silicone: Single-component, nonsag, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - 1. Joint Locations: Sealant joints in contact with weather barrier, weather barrier flashing materials, and as follows:
 - a. Perimeter joints between materials listed above and frames of doors, windows, glazed framing systems, and louvers.
 - 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. The Dow Chemical Company; DowSil 758 Silicone Weather Barrier Sealant.
 - b. Pecora Corporation; AVB Silicone.
- C. Silicone: Mildew-resistant, single-component, nonsag, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - 1. Joint Locations: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces, and as follows:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints in wet locations.
 - c. Other joints as indicated on Drawings.
 - 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
 - b. The Dow Chemical Company; DowSil 786.
- D. Urethane: Multicomponent, nonsag, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 25, Uses T and NT.
 - 1. Joint Locations: Interior joints in horizontal traffic surfaces, and as follows:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.
 - 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corporation; MasterSeal NP 2.
 - b. LymTal International Inc; Iso-Flex 881 or Iso-Flex 885 SG.
 - c. Pecora Corporation; Dynatred.

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- d. Sika Corporation; Joint Sealants; Sikaflex 2c NS TG.
- E. Urethane: Single-component, nonsag, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - 1. Joint Locations: Interior joints in vertical surfaces and horizontal nontraffic surfaces, and as follows:
 - a. Tile control and expansion joints.
 - b. Other joints as indicated on Drawings.
 - 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. Pecora Corporation; Dynatrol I-XL.
 - b. Polymeric Systems, Inc; Flexiprene 1000.
 - c. Sika Corporation; Joint Sealants; Sikaflex Textured Sealant.
 - d. Tremco Incorporated; Dymonic.
- F. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 - 1. Joint Locations: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement, and as follows:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and glazed framing systems.
 - c. Other joints as indicated on Drawings.
 - 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corporation; MasterSeal NP 520.
 - b. Bostik, Inc.; Bosti-Flex Plus.
 - c. Pecora Corporation; AC-20.
 - d. Tremco Incorporated; Tremflex 834.
- G. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 or aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 in accordance with ASTM D2240.
 - 1. Joint Locations: Interior, exposed sawcuts and non-moving control joints in concrete slabs.
 - 2. Color: As selected by Architect from manufacturer's full range.
 - 3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corporation; MasterSeal CR 190.
 - b. Sika Corporation; Joint Sealants; Sikadur 51.

2.05 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834. Sealant effectively reduces airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.

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1. Joint Location:
 - a. Acoustical joints where indicated.
 - b. Other joints as indicated.
2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; RCS20 Acoustical.
 - c. Grabber Construction Products; Acoustical Sealant GSC.
 - d. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant.
 - e. Pecora Corporation; AC-20 FTR.
 - f. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - g. Tremco Incorporated; Tremflex 834.

2.06 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), unless otherwise recommended by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.07 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

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1. Remove laitance and form-release agents from concrete.
 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- 3.02 INSTALLATION OF JOINT SEALANTS
- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.

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2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

G. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters including heads of walls, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.

3.03 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION

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SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Standard hollow-metal doors and frames.
- B. Related Sections:
 - 1. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.

1.02 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.03 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, and finishes.
- B. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.05 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of thermally rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.

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1.06 QUALITY ASSURANCE

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Amweld International, LLC.
 - 2. Ceco Door Products; an Assa Abloy Group company.
 - 3. Curries Company; an Assa Abloy Group company.
 - 4. Deansteel.
 - 5. Fleming-Baron Door Products.
 - 6. Mesker Door Inc.
 - 7. Pioneer Industries, Inc.
 - 8. Security Metal Products Corp.
 - 9. Steelcraft; an Ingersoll-Rand company.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.70 deg Btu/F x h x sq. ft. when tested according to ASTM C518.

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2.03 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. .
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Uncoated steel sheet, minimum thickness of 0.053 inch.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Core: Manufacturer's standard .
 - g. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.
 - 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
 - b. Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Full profile welded.
 - 3. Exposed Finish: Prime.

2.04 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. .
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Manufacturer's standard .
 - 2. Frames:

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- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
- b. Construction: Full profile welded.
- 3. Exposed Finish: Prime.

2.05 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 - 3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.06 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- E. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

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2.07 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 2. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

2.08 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

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3.02 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Solidly pack mineral-fiber insulation inside frames.
 - 4. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.

3.03 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

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SECTION 08 12 59 - FIRE-RATED GLAZED FRAMING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Fire resistive, glazed, metal framed wall assemblies.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include elevations, sections, and installation details for each condition.
 - 2. Include details for each frame type, including dimensioned profiles and metal thicknesses.
 - 3. Include locations of reinforcements and preparations for hardware.
 - 4. Include details of anchorages, joints, field splices, connections, and accessories.
 - 5. Include details of moldings, removable stops, and glazing.
- C. Samples: For each exposed product and for each color and texture specified.

1.03 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For systems to include in maintenance manuals.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Ceco Door Products; an Assa Abloy Group company; E119 Fire Resistive Frame, or comparable product by one of the following:
 - 1. SAFTI FIRST.
 - 2. Technical Glass Products.
- B. Source Limitations: Obtain metal frames, fire-rated glazing, and frame-manufacturer's doors from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire Resistive Wall Assemblies: Assemblies that are listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing in accordance with ASTM E119 or UL 263.

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2.03 COMPONENTS

- A. Steel: With manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.
 - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - 2. Cold-Rolled Sheet and Strip: ASTM A 611.
 - 3. Hot-Rolled Sheet and Strip: ASTM A 570/A 570M.
- B. Glazing Frames: Formed steel, for indicated glass thickness.
- C. Frame and Trim Finish: Factory-applied, baked-enamel or powder-coat finish.
 - 1. Color: As selected by Architect from manufacturer's full range.
- D. As specified in Section 08 88 13 "Fire-Rated Glazing."

2.04 ACCESSORIES

- A. Fasteners: Aluminum, nonmagnetic, stainless-steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.

2.05 FABRICATION

- A. Provide concealed corner reinforcements and alignment clips for accurately fitted hairline joints at butted and mitered connections.
- B. Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.
 - 1. Locate removable stops on the inside of spaces accessed by keyed doors.
- C. Fabricate components to allow secure installation without exposed fasteners.

2.06 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install frames plumb, rigid, properly aligned, and securely fastened in place; according to manufacturer's written instructions.
 - 1. At fire-protection-rated openings, install fire-rated frames according to NFPA 80.
- B. Install frame components in the longest possible lengths with no piece less than 48 inches; components 96 inches or shorter shall be one piece.
- C. Glass: Install glass according to Section 08 88 13 "Fire-Rated Glazing" and frame manufacturer's written instructions.

END OF SECTION

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SECTION 08 36 13 - SECTIONAL DOORS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Sectional-door assemblies.
- B. Related Sections:
 - 1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
 - 2. For power-operated doors, include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Include diagrams for power, signal, and control wiring.
- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard size.

1.03 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sectional doors to include in maintenance manuals.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

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- B. Regulatory Requirements: Comply with provisions in the U.S. Department of Justice's "2010 ADA Standards for Accessible Design" and California Building Code, Chapter 11 applicable to sectional doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain sectional doors from single source from single manufacturer.
1. Obtain operators and controls from sectional door manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. General Performance: Provide sectional doors that comply with performance requirements specified without failure from defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
1. Design Wind Load: As indicated on Drawings.
 2. Testing: In accordance with ASTM E330/E330M.
 3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.
 - a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of door width.
 - b. Deflection of horizontal track assembly shall not exceed 1/240 of door height.
 4. Operability under Wind Load: Design sectional doors to remain operable under design wind load, acting inward and outward.
- C. Seismic Performance: Provide sectional doors that withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

2.03 SECTIONAL-DOOR ASSEMBLY

- A. Aluminum Sectional Door: Provide sectional door formed with hinged sections and fabricated so that finished door assembly is rigid and aligned with tight hairline joints; free of warp, twist, and deformation; and complies with requirements in DASHA 102.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Overhead Door Corporation; 511 Series, or comparable product by one of the following:
 - a. C.H.I. Overhead Doors.
 - b. Clopay Building Products.
 - c. Raynor.

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- d. Wayne-Dalton Corp.
- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000 operation cycles. One operation cycle is complete when door is opened from closed position to the open position and returned to closed position.
- C. Air Infiltration: Maximum rate of 0.4 cfm/sq. ft. when tested in accordance with ASTM E283 or DASMA 105.
- D. U-Value: 0.40 Btu/sq. ft. x h x deg F.
- E. Aluminum Sections: ASTM B221 extruded-aluminum stile and rail members of alloy and temper standard with manufacturer for type of use and finish indicated; in minimum thickness required to comply with requirements; with rail and stile dimensions and profiles indicated on Drawings; and with overlapped or interlocked weather- and pinch-resistant seal at meeting rails.
1. Door-Section Thickness: 1-3/4 inches.
 2. Section Reinforcing: Continuous horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Ensure that reinforcement does not obstruct vision lites.
 - a. Hardware Locations: Provide reinforcement for hardware attachment.
 3. Glazed Panels: Manufacturer's standard, aluminum-framed section with glazing sealed with glazing tape and aluminum or matching vinyl glazing bead. Glazing as follows:
 - a. Insulating Glass Units: Manufacturers' standard unit with tempered glass lites complying with ASTM C1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Quality-Q3.
 - 1) Basis-of-Design Product: Overhead Door; 1/2-inch obscure glazing unit.
- F. Track: Manufacturer's standard, galvanized-steel, "Lift Clearance Track" track system. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides.
1. Material: Galvanized steel, ASTM A653/A653M, minimum G60 zinc coating.
 2. Size: As recommended in writing by manufacturer for door size, weight, track configuration and door clearances indicated on Drawings.
 3. Track Reinforcement and Supports: Provide galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.
- G. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom, top, and jambs of door.
- H. Hardware: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.

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1. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch nominal coated thickness at each end stile and at each intermediate stile, in accordance with manufacturer's written recommendations for door size.
 - a. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible.
 - b. Provide double-end hinges where required for doors more than 16 ft. wide unless otherwise recommended by door manufacturer in writing.
 2. Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Match roller-tire diameter to track width.
- I. Counterbalance Mechanism:
1. Torsion Spring: Adjustable-tension torsion springs complying with requirements of DASMA 102 for number of operation cycles indicated, mounted on torsion shaft.
 2. Cable Drums and Shaft for Doors: Cast-aluminum cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised.
 - a. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.
 - b. Provide one additional midpoint bracket for shafts up to 16 ft. long and two additional brackets at one-third points to support shafts more than 16 ft. long unless closer spacing is recommended in writing by door manufacturer.
- J. Electric Door Operator: Electric door operator assembly of size and capacity recommended by door manufacturer for door and operation cycles specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
1. Comply with NFPA 70.
 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24 V ac or dc.
 3. Safety: Listed in accordance with UL 325 by a qualified testing agency for commercial or industrial use.
 4. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
 5. Operator Type: Manufacturer's standard for door requirements .
 6. Motor: Reversible-type with controller (disconnect switch) for exterior, dusty, wet, or humid motor exposure. Use adjustable motor-mounting bases for belt-driven operators.
 - a. Motor Size: As required to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
 - b. Electrical Characteristics:
 - 1) Phase: Polyphase.

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- 2) Volts: 460 V.
 - 7. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
 - 8. Obstruction Detection: Automatic external entrapment protection consisting of automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
 - a. Monitored Entrapment Protection: Photoelectric sensor designed to interface with door-operator control circuit to detect damage to or disconnection of sensor and complying with requirements in UL 325.
 - 9. Control Station: Surface mounted, three-position (open, close, and stop) control.
 - a. Operation: Push button .
 - b. Interior-Mounted Unit: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
 - 10. Emergency Operation Disconnect Device: Hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
 - 11. Motor Removal: Design operator so motor can be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
- K. Metal Finish: Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
- 1. Anodized Aluminum Finish: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
 - a. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.02 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; in accordance with manufacturer's written instructions.
- B. Tracks:
 - 1. Fasten vertical track assembly to opening jambs and framing with fasteners spaced not more than 24 inches apart.
 - 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install in accordance with UL 325.

3.03 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks in accordance with manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.04 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.
- D. Touchup Painting Galvanized Material: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A780/A780M.

3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

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SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Exterior storefront framing.
 - 2. Exterior manual-swing entrance doors and door-frame units.
- B. Related Sections:
 - 1. Section 08 81 00 "Glass Glazing" for storefront glazing.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples: For each exposed finish required.

1.03 INFORMATIONAL SUBMITTALS

- A. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.
- B. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.
- D. Field quality-control reports.
- E. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C1401. Include periodic quality-control reports.
- F. Sample warranties.

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G. Maintenance data.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Structural-Sealant Glazing: Comply with ASTM C1401 for design and installation of storefront assemblies.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.05 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Assembly: Subject to compliance with requirements, provide product indicated or comparable product by one of the following:
 - 1. Arcadia, Inc.
 - 2. Kawneer North America, an Arconic company.
 - 3. Oldcastle, Inc.
 - 4. YKK AP America Inc.

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- B. Source Limitations: Obtain all components of aluminum-framed entrances and storefront, including framing and accessories, from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:
1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
 - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- E. Structural: Test according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.

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2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
 - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..
 2. Entrance Doors:
 - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
 - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 8 lbf/sq. ft..
- H. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor):
 - a. Fixed glazing and framing areas shall have U-factor of not more 0.36 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.26 as determined according to NFRC 200.
- I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- J. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by storefront systems without failing adhesively or cohesively. Provide sealant that fails cohesively before sealant releases from substrate when tested for adhesive compatibility with each substrate and joint condition required.
1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

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2.03 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 - 1. Basis-of-Design Product: Kawneer North America; Trifab VersaGlaze 601T.
 - 2. Construction: Thermally broken.
 - 3. Glazing System: Structural silicone glazed.
 - 4. Glazing Plane: Front.
 - 5. Finish: Clear anodic finish.
 - 6. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
 - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - a. Sheet and Plate: ASTM B 209.
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.
 - 2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
 - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.04 STANDARD ENTRANCE DOOR SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Kawneer North America.
 - 2. Oldcastle Building Envelope.
 - 3. YKK AP America Inc.
- B. Standard Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
 - 1. Basis-of-Design Product: Kawneer North America; 350 Medium Stile Entrance.

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2. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
3. Door Design: Medium stile; 3-1/2-inch nominal width.
4. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.

2.05 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."

2.06 GLAZING

- A. Glazing: Comply with Section 088100 "Glass Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Sealant For Structural Glazing, One Component: Shop/Factory or Site Installed. ASTM C 1184, neutral-curing silicone formulation compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant, and approved by structural-sealant manufacturer for use in curtain-wall systems indicated.
 1. Available Products:
 - a. Dowsil.: Dow Corning 795 or 995.
 - b. Momentive Performance Products.: GE UltraGlaze SSG4000 or SilPruf SCS2000.
 - c. Tremco Inc.: Proglaze SSG.
 2. Color: As selected by Architect from manufacturer's full range.
- D. Primer: Nonstaining type, recommended by sealant manufacturer to suit application.
- E. Joint Cleaner: Noncorrosive and nonstaining type, recommended by sealant manufacturer; compatible with joint forming materials and not damaging to exposed surfaces.
- F. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

2.07 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

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1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
- B. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- C. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

2.08 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Physical and thermal isolation of glazing from framing members.
 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.09 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

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PART 3 - EXECUTION

3.01 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 08 81 00 "Glass Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.02 INSTALLATION OF STRUCTURAL GLAZING

A. Prepare surfaces that will contact structural sealant in accordance with sealant manufacturer's written instructions, to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

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- B. Set glazing into framing in accordance with sealant manufacturer's and framing manufacturer's written instructions and standard practice. Use a spacer or backer as recommended by manufacturer.
- C. Set glazing with proper orientation, so that coatings face exterior or interior as specified.
- D. Hold glazing in place using temporary retainers of type and spacing recommended by manufacturer, until structural sealant joint has cured.
- E. Apply structural sealant to completely fill cavity, in accordance with sealant manufacturer's and framing manufacturer's written instructions and in compliance with local codes.
- F. Apply structural sealant at temperatures indicated by sealant manufacturer for type of sealant.
- G. Allow structural sealant to cure in accordance with manufacturer's recommendations.
- H. Clean and protect glass as indicated in Section 08 81 00 "Glass Glazing."

3.03 FIELD QUALITY CONTROL

- A. Field-Glazed Structural Silicone Glazed Systems: Engage a site representative qualified by structural silicone sealant manufacturer to inspect substrate conditions; surface preparation; and application of structural silicone sealant.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of two tests in areas as directed by Architect.
- D. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION

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SECTION 08 45 13 - STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Aluminum-framed assemblies glazed with structured-polycarbonate panels.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum components of panel assemblies.
- B. Shop Drawings: For panel assemblies.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior.
- C. Samples: In manufacturer's standard size.
 - 1. For each type of structured-polycarbonate panel.
 - 2. For each type of exposed finish for framing members.
- D. Delegated-Design Submittal: For panel assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.03 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each structured-polycarbonate-panel assembly, for tests performed by a qualified testing agency.
- B. Field quality-control reports.
- C. Sample Warranties: For special warranties.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For panel assemblies to include in maintenance manuals.

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1.05 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.06 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of panel assemblies that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - c. Water leakage.
 2. Warranty Period: Five years from date of Substantial Completion.
- B. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace structured-polycarbonate panels that exhibit defects in materials or workmanship within specified warranty period.
1. Defects include, but are not limited to, the following:
 - a. Delamination.
 - b. Color changes exceeding requirements.
 - c. Losses in light transmission beyond 6 percent from original when measured according to ASTM D1003.
 2. Warranty Period: 10 years from date of Substantial Completion.
- C. Special Aluminum-Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
1. Failures include, but are not limited to, checking, crazing, peeling, chalking, and fading of finishes.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design structured-polycarbonate-panel assemblies.
- B. Structural Loads: As indicated on Drawings.
- C. Deflection Limits:

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1. Vertical Panel Assemblies: Limited to 1/175 of clear span for each assembly component.
- D. Structural-Test Performance: Panel assemblies tested according to ASTM E330, as follows:
 1. When tested at positive and negative wind-load design pressures, assemblies do not show evidence of deflection exceeding specified deflection limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not show evidence of material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Water Penetration under Static Pressure: Provide panel assemblies that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 9 lbf/sq. ft..
- F. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- G. Energy Performance: Provide panel assemblies with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below and certified and labeled according to NFRC:
 1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.28 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area as determined according to ASTM E283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft..

2.02 STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES

- A. Structured-Polycarbonate-Panel Assemblies: Translucent assemblies that are supported by aluminum framing and glazed with structured-polycarbonate panels.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide EXTECH Exterior Technologies, Inc.; Lightwall 3440, or comparable product by one of the following:
 - a. CPI Daylighting, Inc.
 - b. Duo-Gard Industries, Inc.
 - c. Kingspan Light + Air LLC.
 - d. Major Industries, Inc.

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e. Super Sky Products Enterprises, LLC.

2.03 STRUCTURED-POLYCARBONATE PANELS

- A. Structured-Polycarbonate Panels: Translucent, extruded-polycarbonate sheet with multiwall cellular cross section that provides isolated airspaces and that is coextruded with a UV-protective layer.
- B. Panel Thickness: Nominal 50 mm.
- C. UV Resistance: On outer surface.
- D. Color: As selected by Architect from manufacturer's full range.
- E. Panel Performance:
 - 1. Plastic Self-Ignition Temperature: 650 deg F or more according to ASTM D1929.
 - 2. Smoke-Developed Index: 450 or less according to ASTM E84, or 75 or less according to ASTM D2843.
 - 3. Combustibility Classification: Class CC1 based on testing according to ASTM D635.
 - 4. Interior Finish Classification: Class A based on testing according to ASTM E84.
 - 5. Color Change: Not more than 3.0 units Delta E, when measured according to ASTM D2244, after outdoor weathering compliant with procedures in ASTM D1435.
 - a. Outdoor Weathering Conditions: 60 months in Arizona or 120 months in a moderate North American climate.

2.04 ALUMINUM FRAMING SYSTEMS

- A. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.
 - 1. Construction: Thermally broken, extruded aluminum.
 - 2. Provide "Strongspan" members at tongue and groove panel joints where system height exceeds 5 feet.
- B. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.
 - 1. Sheet and Plate: ASTM B209.
 - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
 - 3. Extruded Structural Pipe and Tubes: ASTM B429.
 - 4. Structural Profiles: ASTM B308.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.

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- D. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding fasteners and accessories; compatible with adjacent materials.
 - 1. At closures, retaining caps, or battens, use ASTM A193, 300 series stainless-steel screws.
 - 2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.
- E. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123 or ASTM A153 requirements.
- F. Anchor Bolts: ASTM A307, Grade A, galvanized steel.
- G. Concealed Flashing: Corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- H. Exposed Flashing and Closures: Aluminum sheet not less than 0.040 inch thick, finished to match framing.
- I. Framing Gaskets: Manufacturer's standard gasket system with low-friction surface treatment designed specifically for retaining structured-polycarbonate panels.
- J. Frame-System Sealants: As recommended in writing by manufacturer.
- K. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.05 FABRICATION

- A. Fabricate aluminum components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Internal guttering systems or other means to drain water passing through joints and moisture migrating within assembly to exterior.
- B. Fabricate aluminum sill closures with weep holes and for installation as continuous component.
- C. Reinforce aluminum components as required to receive fastener threads.

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2.06 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - 1. Color: As selected by Architect from full range of industry colors and color densities.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Comply with manufacturer's written instructions.
 - 1. Do not install damaged components.
 - 2. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
 - 3. Rigidly secure nonmovement joints.
 - 4. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and immobilization of moving joints.
 - 5. Seal joints watertight unless otherwise indicated.
- B. Metal Protection: Where aluminum components will contact dissimilar materials, protect against galvanic action by painting contact surfaces with corrosion-resistant coating or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.
- C. Install components plumb and true in alignment with established lines and elevations.
- D. Erection Tolerances: Install panel assemblies to comply with the following maximum tolerances:
 - 1. Alignment: Limit offset from true alignment to 1/32 inch where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches; otherwise, limit offset to 1/8 inch.
 - 2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet, but no greater than 1/2 inch over total length.

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3.03 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, panel assemblies shall be tested according to AAMA 501.2 and shall not show evidence of water penetration.
- B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

END OF SECTION

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SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following, but is not necessarily limited to:
 - 1. Door hardware.
 - 2. Storefront and Entrance door hardware.
 - 3. Gate hardware.
 - 4. Thresholds, gasketing and weather-stripping.
- C. Related Sections: The following sections are noted as containing requirements that relate to this Section, but may not be limited to this listing.
 - 1. Division 08: Hollow Metal Doors and Frames.
 - 2. Division 08: Flush Wood Doors.
 - 3. Division 08: Aluminum-Framed Storefronts.

1.03 REFERENCES

- A. 2022 California Building Code, CCR Title 24, Part 2
- B. BHMA - Builders' Hardware Manufacturers Association
- C. DHI - Door and Hardware Institute
- D. NFPA - National Fire Protection Association.
 - 1. NFPA 80 - Fire Doors and Other Opening Protectives
 - 2. NFPA 105 - Smoke and Draft Control Door Assemblies
- E. UL - Underwriters Laboratories.
 - 1. UL 10C - Fire Tests of Door Assemblies
 - 2. UL 305 - Panic Hardware
- F. WHI - Warnock Hersey Incorporated
- G. SDI - Steel Door Institute

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1.04 SUBMITTALS & SUBSTITUTIONS

- A. General: Submit in accordance with Conditions of the Contract and Division 01 Specification sections.
- B. Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Submit electronic PDF copies of schedule organized vertically into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
1. Include a Cover Sheet with:
 - a. Job Name, location, telephone number.
 - b. Architects name, location and telephone number.
 - c. Contractors name, location, telephone number and job number.
 - d. Suppliers name, location, telephone number and job number.
 - e. Hardware consultant's name, location and telephone number.
 2. Job Index information included:
 - a. Numerical door number index including; door number, hardware heading number and page number.
 - b. Complete keying information (referred to DHI hand-book "Keying Systems and Nomenclature"). Provision should be made in the schedule to provide keying information when available; if it is not available at the time the preliminary schedule is submitted.
 - c. Manufacturers' names and abbreviations for all materials.
 - d. Explanation of abbreviations, symbols, and codes used in the schedule.
 - e. Mounting locations for hardware.
 - f. Clarification statements or questions.
 - g. Catalog cuts and manufacturer's technical data and instructions.
 3. Vertical schedule format sample:

Heading Number 1 (Hardware group or set number - HW Group #1)				
(a) 1 Single - Door #101 - Corridor 101 to Exterior			(b) 90°	(c) RH
(d) 3'-0" x 7'-0" x 1-3/4" - Wood Door x Hollow Metal Frame - 20 Minute				
(e) 1.	(f) 3 ea	(g) Hinges - (h) 5BB1 4.5 x 4.5 NRP	(i) 1/2 TMS	(j) 630
2.	1 ea	Lockset - ND80P6D x RHO x RH x 10-025 x JTMS		(k) IVE
3.	1 ea	Closer - 4040XP x EDA x TBSRT		SCH
			689	LCN

- (a) Single or pair of doors with opening number and location.
- (b) Degree of opening.
- (c) Hand of door(s).
- (d) Door/frame dimensions and material; Label requirements, if any.
- (e) Hardware item line # (Optional).
- (f) Quantity.
- (g) Product description.

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- (h) Product part number.
 - (i) Fastenings and other pertinent information.
 - (j) Hardware finish codes per ANSI/BHMA A156.18.
 - (k) Manufacturer abbreviation.
 - D. Make substitution requests in accordance with Division 01. Substitution requests must be made prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.
 - E. Keying Schedule: Submit separate detailed schedule indicating clearly how the District's final instructions on keying of locks has been fulfilled.
 - F. Wiring Diagrams: Provide product data and wiring and riser diagrams for all electrical products listed in the Hardware Schedule portion of this section.
 - G. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
 - H. Furnish as-built/as-installed schedule with close-out documents, including keying schedule and transcript, wiring/riser diagrams, manufacturers' installation and adjustment and maintenance information.
 - I. Fire Door Assembly Testing: Submit a written record of each fire door assembly to the District to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.
 - J. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with District and Architect in providing information necessary for required LEED rating.
- 1.05 QUALITY ASSURANCE
- A. Obtain each type of hardware (latch and lock sets, hinges, closers, exit devices, etc.) from a single manufacturer.
 - B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to District, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
 - 1. Responsible for detailing, scheduling and ordering of finish hardware.
 - 2. Meet with District to finalize keying requirements and to obtain final instructions in writing.
 - 3. Stock parts for products supplied and are capable of repairing and replacing hardware items found defective within warranty periods.

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- C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not.
 - 1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".
- E. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- F. Product packaging to be labelled in compliance with CA Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.
- B. Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.
- C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.
- D. Contractor to inventory door hardware jointly with representatives of hardware supplier and hardware installer until each all are satisfied that count is correct.

1.07 WARRANTY

- A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:
 - 1. Locksets: Ten (10) years.
 - 2. Exit devices: Ten (10) years.
 - 3. Closers: Thirty (30) years.
 - 4. All other hardware: Two (2) years.

1.08 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for continued adjustment, maintenance, and removal and replacement of door hardware.

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1.09 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference at least one week prior to beginning work of this section.
- B. Attendance: Architect, Construction Manager, General Contractor, Security Contractor, Hardware Supplier, Installer, Key District Personnel, and Project Inspector.
- C. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review District's keying standards.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

<u>Item</u>	<u>Manufacturer</u>	<u>Acceptable Substitutes</u>
Hinges	Ives	Hager, Stanley, McKinney
Locks, Latches & Cylinders	Schlage	None – District Standard
Exit Devices	Von Duprin	None – District Standard
Closers	LCN	None – District Standard
Flush Bolts	Ives	Trimco, BBW, DCI
Door Stops	Ives	Trimco, BBW, DCI
Protection Plates	Ives	Trimco, BBW, DCI
Overhead Stops	Glynn-Johnson	Or Approved Equal
Seals, Bottoms & Thresholds	Zero	Pemko, National Guard

2.02 MATERIALS

- A. Hinges:
 - 1. Provide hinges conforming to ANSI/BHMA A156.1.
 - 2. Hinges shall be sized in accordance with the following:
 - a. Height:
 - 1) Doors up to 42" wide: 4-1/2 inches.
 - 2) Doors 43" to 48" wide: 5 inches.
 - b. Width: Sufficient to clear frame and trim when door swings 180 degrees.
 - c. Number of Hinges: Provide 3 hinges per leaf to 7'-5" in height. Add one for each additional 2 feet in height.
 - 3. Exterior out-swinging hinges shall be non-ferrous material and shall have stainless steel hinge pins. All doors to have non-rising pins.
 - 4. Furnish non-removable pins (NRP) at all exterior out-swing doors and interior key lock doors with reverse bevels.
- B. Continuous Hinges:
 - 1. Provide aluminum geared continuous hinges fabricated from 6063-T6 aluminum conforming to ANSI/BHMA A156.26, Grade 1.
 - 2. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.

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3. Provide continuous hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
 4. Provide continuous hinges 1" shorter in length than nominal height of door, unless otherwise noted, with symmetrical hole pattern.
 5. Install continuous hinges with fasteners supplied by manufacturer.
- C. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Rhodes" lever design.
1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3 hour fire doors.
 2. Provide cylindrical locksets exceeding the ANSI/BHMA A156.2 Grade 1 performance standards for strength, security, and durability in the categories below:
 - a. Abusive locked lever torque – minimum 3,100 inch-pounds without gaining access.
 - b. Offset lever pull – minimum 1,600 foot pounds without gaining access.
 - c. Vertical lever impact – minimum 100 impacts without gaining access.
 - d. Cycle Test – tested to minimum 16 million cycles with no visible lever sag; without the use of performance aids such as set screws or spacers.
 3. Cylinders: Refer to "KEYING" article, herein.
 4. Provide locks with standard 2-3/4" backset, unless noted otherwise, with 1/2" latch throw. Provide proper latch throw for UL listing at pairs.
 5. Provide locksets with separate solid steel anti-rotation thru-bolts, and no exposed screws.
 6. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
 7. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
 8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 9. Provide levers with vandal resistant technology as scheduled for use at abusive applications.
- D. Exit devices: Von Duprin as scheduled.
1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
 2. Provide certificate by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 standards.
 3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
 4. Provide exit devices cut to door width and height. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
 5. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
 6. Provide flush end caps for exit devices.
 7. Exit devices shall comply with CBC Section 11B-404.2.7 and shall be mounted between 34" and 44" above the finished floor surface.

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8. Provide exit devices UL certified to meet 5 lbs. maximum unlatching force requirements according to the CBC Section 11B-309.4.
 9. Cylinders: Refer to "KEYING" article, herein.
 10. Provide cylinder dogging as specified at non fire-rated openings.
 11. Removable Mullions: Provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
 12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
 13. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
 14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.
 15. Provide exit devices with manufacturer's approved strikes.
 16. Provide electrified options as scheduled.
- E. Closers: LCN as scheduled.
1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
 2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
 3. Provide certificate by independent testing laboratory that door closers have completed over 10,000,000 cycles and can still meet ANSI/BHMA A156.4 standards.
 4. Cylinder Body: 1-1/2" diameter with 3/4" diameter double heat-treated pinion journal.
 5. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120° F to -30° F.
 6. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
 7. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
 8. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
 9. Pressure Relief Valve (PRV) Technology: Not permitted.
 10. Provide door closers powder coated to match balance of door hardware. Powder coating finish shall be certified to exceed 100 hours salt spray testing as described in ANSI/BHMA A156.4 and ASTM B117.
 11. Provide special rust inhibitor (SRI) in highly corrosive areas, and where noted in hardware sets.
 12. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
- F. Flush Bolts & Dust Proof Strikes:
1. Automatic flush bolts shall be of the low operating force design.
 2. Provide top bolt only model for interior doors where applicable and as permitted by testing procedures.
 3. Provide dust proof strikes at openings using bottom bolts.

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4. Manual flush bolts shall only be permitted on storage or mechanical openings, as scheduled.
 - G. Door Stops:
 1. Unless otherwise noted in hardware sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
 2. Do not install floor stops more than four (4) inches from the face of the wall or partition (CBC Section 11B-307).
 3. Provide backing plate at wall framing behind wall type.
 4. Overhead stops shall be made of stainless steel and non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions. Stop-only function shall be provided at fire-rated openings.
 - H. Protection Plates:
 1. Provide kick, mop, and/or armor plates minimum of 0.050" thick, with four beveled edges. Furnish with sheet metal or wood screws, finished to match plates.
 2. Kick plates shall be sized 10" high and 2" less door width (LDW) at single doors and 10" high and 1" LDW at pairs or doors.
 3. Provide mop and armor plates with sizes as scheduled in hardware sets.
 - I. Thresholds: As scheduled and per details.
 1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope. Thresholds shall comply with CBC Section 11B-404.2.5.
 2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 07 "Thermal and Moisture Protection".
 3. Use 1/4" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
 - J. Seals: Provide silicone gasketing at all rated and exterior doors.
 1. Smoke & Draft Control Doors: Provide UL10C Classified gasketing that complies with NFPA 80 & NFPA 252 for use on "S" labeled Positive Pressure door assemblies.
 - K. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.
- 2.03 KEYING
- A. Furnish a Proprietary Schlage Primus masterkey system as directed by the District. Key system to be designated and combined by the Schlage Master Key Department even if pinned by the Authorized Key Center, Authorized Security Center or a local authorized commercial dealer.
 - B. A detailed keying schedule is to be prepared by the District and/or architect in consultation with a representative of Allegion or an Authorized Key Center or Authorized Security Center. Each keyed cylinder on every keyed lock is to be listed separately showing the door #, key group (in BHMA terminology), cylinder type, finish and location on the door.

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- C. Furnish all cylinders in the Schlage Full Size Interchangeable Core (FSIC) style. Pack change keys independently (PKI).
 - D. Furnish construction keying for doors requiring locking during construction.
 - E. Furnish all keys with visual key control.
 - 1. Stamp key "Do Not Duplicate".
 - 2. Stamp (BHMA) key symbol on key.
 - 3. Stamp unique owner identifier from the key bow.
 - F. Furnish all cylinders with visual key control.
 - 1. Stamp (BHMA) key symbol on side of cylinder (CKC).
 - G. Furnish mechanical keys as follows:
 - 1. Furnish 2 cut change keys for each different change key code.
 - 2. Furnish 1 uncut key blank for each change key code.
 - 3. Furnish 6 cut masterkeys for each different masterkey set.
 - 4. Furnish 3 uncut key blanks for each masterkey set.
 - 5. Furnish 2 cut control keys cut to the top masterkey for permanent I/C cylinders.
 - 6. Furnish 1 cut control key cut to each SKD combination.
 - H. Furnish Schlage Padlocks and the cylinders to tie them into the masterkey system for gates, storage boxes, utility valve security, roof hatches and roll-up doors keyed as directed in the keying schedule.
 - 1. Furnish KS43F3200 padlock for use with FSIC Schlage cylinders.
 - I. Furnish one Schlage cabinet lock for each cabinet door or drawer so designated on the drawings or keying schedule to match the masterkey system.
 - 1. Furnish CL777R for use with FSIC Schlage cylinders.
- 2.04 FINISHES
- A. Generally to be satin chrome US26D (626 on bronze and 652 on steel) unless otherwise noted.
 - B. Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless otherwise noted.
 - C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.
 - D. Aluminum items to be finished anodized aluminum except thresholds which can be furnished as standard mill finish.
- 2.05 FASTENERS
- A. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.
 - B. Screws for butt hinges shall be flathead, countersunk, full-thread type.

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- C. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.
- D. Provide expansion anchors for attaching hardware items to concrete or masonry.
- E. All exposed fasteners shall have a phillips head.
- F. Finish of exposed screws to match surface finish of hardware or other adjacent work.
- G. All Exit Devices and Lock Protectors shall be fastened to the door by the means of sex bolts or through bolts.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.
- C. Fire-Rated Door Assembly Inspection: Upon completion of the installation, all fire door assemblies shall be inspected to confirm proper operation of the closing device and latching device and that only the manufacturer's furnished fasteners are used for installation and that it meets all criteria of a fire door assembly per NFPA 80 (Standard for Fire Doors and Other Opening Protectives). A written record shall be maintained and transmitted to the Owner to be made available to the Authority Having Jurisdiction (AHJ). The inspection of the swinging fire doors shall be performed by a certified FDAI (Fire Door Assembly Inspector) with knowledge and understanding of the operating components of the type of door being subjected to the inspection. The record shall list each fire door assembly throughout the project and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and requirements of DHI.
- B. Use the templates provided by hardware item manufacturer.
- C. Mounting heights for hardware shall be as recommended by DHI. Operating hardware shall be located between 34" and 44" above finish floor to comply with CBC Section 11B-404.2.7.
- D. Door Closers:
 - 1. Place door closers inside building, stairs, rooms, etc. Closers shall be installed to permit doors to swing 180 degrees or maximum allowable by conditions.

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2. Maximum effort to operate closers shall not exceed 5 lbs., such pull or push effort being applied at right angles to hinged doors.
 3. When fire doors are required, the maximum effort to operate the closer may be increased but shall not exceed 15 lbs. when specifically approved by fire marshal.
 4. All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.
 5. Compensating devices or automatic door operators may be utilized to meet the above standards.
 6. Per CBC Section 11B-404.2.8.1, doors shall take minimum of 5 seconds to move from an open position of 90 degrees to 12 degrees to the latch jamb.
- E. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- G. Set thresholds for exterior doors in full bed of butyl-rubber sealant.
- H. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.
- 3.03 ADJUST AND CLEAN
- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Clean adjacent surface soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy, return to that work area and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.
- E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

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3.04 HARDWARE LOCATIONS

- A. Conform to CCR, Title 24, Part 2; and ADA Standards; and the drawings for access-compliant positioning requirements for the disabled.

3.05 FIELD QUALITY CONTROL

- A. Contractor is responsible for providing the services of an Architectural Hardware Consultant (AHC) or a proprietary product technician to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturers' instructions and as specified herein.

3.06 HARDWARE SCHEDULE

- A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.
- B. While the hardware schedule is intended to cover all doors, and other movable parts of the building, and establish type and standard of quality, the contractor is responsible for examining the Plans and Specifications and furnishing proper hardware for all openings whether listed or not. If there are any omissions in hardware groups in regard to regular doors they shall be called to the attention of the Architect prior to bid opening for instruction; otherwise, list will be considered Complete. No extras will be allowed for omissions.
- C. The Door Schedule on the Drawings indicates which hardware set is used with each door.

MANUFACTURERS ABBREVIATIONS

IVE	=	Ives	Hinges, Flush Bolts, Door Stops & Kick Plates
LCN	=	LCN	Door Closers
LOC	=	Locinox	Gate Closers
SCE	=	Schlage Electronics	Electronic Locks & Exit Device Trim
SCH	=	Schlage Lock	Locks, Latches & Cylinders
VON	=	Von Duprin	Exit Devices
ZER	=	Zero International	Thresholds, Gasketing & Weather-stripping

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HW GROUP NO. 01

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	EA	CONT. HINGE	112HD	628	IVE
1	EA	VANDL CLASSROOM LOCK	ND95TD RHO XN12-035	626	SCE
1	EA	PRIMUS CORE	20-740	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP/HOLDER	FS43	626	IVE
1	EA	WEATHERSTRIP/SEALS	188SBK PSA		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	65A	A	ZER

HW GROUP NO. 02

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
6	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	MANUAL FLUSH BOLT	FB51T	630	IVE
1	EA	DBL CYL STORE LOCK	ND66JD RHO	626	SCH
2	EA	PRIMUS CORE	20-740	626	SCH
2	EA	FLOOR STOP	FS436	626	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER
2	EA	AUTO DOOR BOTTOM	355AA	AA	ZER
1	EA	ASTRAGAL	383AA	AA	ZER

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HW GROUP NO. 03

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	PRIVACY W/ INDICATOR	L9456T 06N L583-363 L283-722	626	SCH
1	EA	PRIMUS CORE	20-740	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER

HW GROUP NO. 04

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	VANDL STOREROOM LOCK	ND96TD RHO	626	SCH
1	EA	PRIMUS CORE	20-740	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	188SBK PSA	BK	ZER

HW GROUP NO. 05

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	VANDL OFFICE LOCK	ND91TD RHO	626	SCH
1	EA	PRIMUS CORE	20-740	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE

END OF SECTION

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SECTION 08 81 00 - GLASS GLAZING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Doors.
 - 2. Storefront framing.
 - 3. Glazing sealants and accessories.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.04 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for sealants, indicating VOC content.
- B. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Qualification Data: For Installer and manufacturers of insulating-glass units with sputter-coated, low-E coatings.
- D. Product Certificates: For glass.

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- E. Argon Gas Infill Compliance Certificate: IGCC/IGMA argon fill certification program certificates.
- F. Preconstruction adhesion and compatibility test report.
- G. Sample Warranties: For special warranties.

1.05 QUALITY ASSURANCE

- A. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- B. Argon Gas Filled Insulating-Glass Testing Program: Fabricator shall employ non-destructive argon measuring equipment such as GasGlass by Sparklike Ltd to ensure that argon gas filled insulating glass units consistently pass IGCC/IGMA criteria for their argon fill certification programs.
- C. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance and who employs glazing technicians certified under the Architectural Glass and Metal Technician (AGMT) certification program.
- D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.
- E. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- F. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.06 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates in accordance with ASTM C 1087.

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3. Submit to testing agency, number of pieces as recommended by sealant manufacturer of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
6. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.07 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations for Glass: Obtain coated glass from single source from single manufacturer.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.02 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 1. Sealants:
 - a. VOC content limits for field applications.

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2.03 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Quality Requirements," to design exterior glazing.
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the California Building Code and ASTM E1300.
 - 1. Design Wind Pressures: As indicated on Drawings and in accordance with ASCE 7.
 - 2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 - 3. Thermal Loads: Design glazing to resist thermal stress breakage induced by differential temperature conditions and limited air circulation within individual glass lites and insulated glazing units.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 - 2. For laminated-glass lites, properties are based on products of construction indicated.
 - 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 - 4. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F.
 - 5. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.
 - 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

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2.04 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 - 2. IGMA Publication Insulating Glazing Tolerances: IGMA TB-1200, "Guidelines for Insulating Glass Dimensional Tolerances."
 - 3. IGMA Publication for Insulating Glass: IGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
 - 4. IGMA Publication for Thermal Stress: IGMA TM-1500, "Guidelines to Reduce Instances of Thermal Stress."
 - 5. NGA Publications: "Guidelines for the Appearance of Insulating Glass Unit Edges in Commercial Applications at the Time of Installation."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.05 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
- B. Heat-Strengthened and Fully Tempered Float Glass: ASTM C1048, Kind HS (heat strengthened) and Kind FT (fully tempered), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Bow and Warpage Tolerance: 25 percent less than ASTM C 1048.
 - 2. Distortion Limits: Calculated using LiteSentry Osprey Distortion + Flatness Inspection System for Glass and Plastic.
 - a. Peak-to-Valley Roll Wave:

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- 1) Peak-to-Valley Distance:
 - a) No dimension greater than 0.005 inch, with an average not to exceed 0.003 inch, central area.
 - b) No dimension greater than 0.008 inch within 250 mm of the leading and trailing edge.
 - b. Optical Roll Wave: For clear and Low iron glass 1/4 inch to 3/8 inch thick without ceramic frit or ink, maximum plus or minus 100 mD (millidiopter) over 95 percent of the glass surface.
 3. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 4. Kind HS glass greater than 1/4 inch in thickness shall meet strength requirements in accordance with ASTM C 1048.
- C. Ceramic-Coated Vision Glass: ASTM C1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in GANA's "Engineering Standards Manual."

2.06 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190.
1. Sealing System: Dual seals.
 2. Perimeter Spacer: Provide manufacturer's standard spacer material and construction as required to meet Performance Requirements in Division 08 door, window, and framing assembly sections scheduled to receive insulating glass glazing.
 - a. Provide from one of the following:
 - 1) Aluminum with mill or clear anodic finish.
 3. Argon Gas Filled Units: Listed in the IGCC/IGMA Certified Products Directory designated "GCI" for "Gas Content, Initial and After Weathering."
 4. Desiccant: Molecular sieve or silica gel, or blend of both.

2.07 GLAZING SEALANTS

- A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class as recommended by manufacturer. Use NT.

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2.08 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks, Spacers, and Edge Blocks:
 - 1. Type recommended by sealant or glass manufacturer with a Shore A durometer hardness of 85, plus or minus 5.
- C. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.09 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

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3.03 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.04 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

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- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.05 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.06 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

3.07 GLASS GLAZING SCHEDULE

- A. GL-1: Monolithic, fully tempered float glass.
 - 1. Glass: Clear float glass.
 - 2. Minimum Thickness: 6 mm.
- B. GL-2: Low-E-coated, clear insulating glass.
 - 1. Overall Unit Thickness: 1 inch (25 mm).
 - 2. Minimum Thickness of Each Glass Lite: 6 mm.

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- 3. Outdoor Lite: Heat-strengthened float glass.
 - 4. Interspace Content: Argon.
 - 5. Indoor Lite: Heat-strengthened float glass.
 - 6. Low-E Coating:
 - a. Basis-of-Design Product: Vitro; Solarban 70.
 - b. Location: Sputtered on second surface.
- C. GL-3: Not used.
- D. GL-4: Ceramic-coated, low-E, insulating vision glass.
- 1. Overall Unit Thickness: 1 inch (25 mm).
 - 2. Minimum Thickness of Each Glass Lite: 6 mm.
 - 3. Outdoor Lite: Clear, heat-strengthened float glass.
 - 4. Interspace Content: Argon.
 - 5. Indoor Lite: Clear, heat-strengthened float glass.
 - 6. Low-E Coating:
 - a. Basis-of-Design Product: Vitro; Solarban 70.
 - b. Location: Sputtered on second surface.
 - 7. Ceramic Coating and Pattern: Custom pattern as indicated on Drawings.
 - a. Coating Location: Fourth surface.

END OF SECTION

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SECTION 08 88 13 - FIRE-RATED GLAZING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Fire-protection-rated glazing.
 - 2. Fire-resistance-rated glazing.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 DEFINITIONS

- A. Fire-Protection-Rated Glazing: Glazing that prevents spread of fire and smoke and complies with requirements for rated openings; incapable of blocking radiant heat
- B. Fire-Resistance-Rated Glazing: Glazing that prevents spread of fire and smoke and radiant heat and complies with requirements for rated walls and rated openings; capable of blocking radiant heat

1.03 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product; 12 inches square.

1.05 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for sealants, indicating VOC content.
- B. Product Certificates: For each type of glass and glazing product.
- C. Sample Warranties: For special warranties.

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1.06 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the NGA's Certified Glass Installer Program.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.08 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during remainder of construction period.

1.09 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

- 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations for Glass: For each glass type, obtain from single source from single manufacturer.
- B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.02 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Sealants:
 - a. VOC content limits for field applications.

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2.03 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.04 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.
- C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
- D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.05 GLASS PRODUCTS

- A. Float Glass: ASTM C1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

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- C. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
 - 2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.06 FIRE-PROTECTION-RATED GLAZING

- A. General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing in accordance with NFPA 257 or UL 9, including hose-stream test, and shall comply with NFPA 80.
- B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether glazing has passed hose-stream test; whether glazing meets 450 deg F temperature-rise limitation; and fire-resistance rating in minutes.
- C. Fire-Protection-Rated Laminated Ceramic Glazing: Laminated glass made from two plies of ceramic glass; 8-mm total thickness; complying with 16 CFR 1201, Category II.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Schott North America, Inc.; Pyran Platinum L.
 - b. Technical Glass Products; an Allegion brand; FireLite Plus.
 - c. Vetrotech Saint-Gobain; Keralite Laminated.

2.07 FIRE-RESISTANCE-RATED GLAZING

- A. General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing in accordance with ASTM E119 or UL 263.
- B. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that glazing is approved for use in walls, and fire-resistance rating in minutes.
- C. Fire-Resistance-Rated Framing and Doors: Fire-resistance-rated glazing with 60-, 90-, and 120-minute ratings requires framing and doors from glass supplier, tested as an assembly complying with ASTM E119 or UL 263.

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- D. Fire-Resistance-Rated Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, clear float glass; with intumescent interlayers; complying with 16 CFR 1201, Category II.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Vetrotech Saint-Gobain; Contraflam.

2.08 GLAZING ACCESSORIES

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
 - 1. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

2.09 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- C. Perimeter Insulation for Fire-Resistance-Rated Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.03 GLAZING, GENERAL

- A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.
- B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches.

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1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 2. Provide 1/8-inch- minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.
- I. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.
- 3.04 GASKET GLAZING (DRY)
- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop, so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- D. Install gaskets so they protrude past face of glazing stops.
- 3.05 SEALANT GLAZING (WET)
- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

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- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.06 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.07 FIRE-RATED GLAZING SCHEDULE

- A. FGL-1: 45-minute fire-protection-rated glazing.
 - 1. Glazing: Fire-protection-rated laminated ceramic glazing .
- B. FGL-2: 60 -minute fire-resistance-rated glazing complying with ASTM E119 or UL 263 in a tested assembly of glass and framing with 450 deg F (250 deg C) temperature-rise limitation.
 - 1. Glazing: Fire-resistance-rated laminated glass with intumescent interlayers.

END OF SECTION

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SECTION 09 05 61.13 - MOISTURE VAPOR EMISSION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Fluid-applied membrane-forming systems that control the moisture-vapor-emission rate of interior concrete installed as required prior to installation of floor coverings, floor coatings, and other flooring products and systems.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.
 - 2. Division 09 Sections for flooring system substrate requirements.

1.02 DEFINITIONS

- A. MVE: Moisture vapor emission.
- B. MVER: Moisture vapor emission rate.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.04 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for coatings, indicating VOC content.
- B. Product Test Reports: For each MVE-control system, for tests performed by a qualified testing agency.
- C. Preinstallation testing reports.
- D. Field quality-control reports.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Employs factory-trained personnel who are available for consultation and Project-site inspection.
- B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

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1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Comply with MVE-control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.
 - 1. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature of not less than 65 deg F and not more than 85 deg F at least 48 hours before use.
 - 2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE-control system manufacturer, but not less than 65 deg F or more than 85 deg F and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 3. Install MVE-control systems where concrete surface temperatures will remain a minimum of 5 deg F higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

1.08 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace vapor retarder and floor coverings, floor coatings, and other flooring products and systems that fail due to moisture vapor emission and moisture born contaminants within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Coatings:
 - a. VOC content limits for field applications.

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2.02 PERFORMANCE REQUIREMENTS

- A. MVE-Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:
 - 1. MVER: Maximum 25 lb of water/1000 sq. ft. when tested according to ASTM F1869.
 - 2. Relative Humidity: Maximum 90 percent when tested according to ASTM F2170 using in situ probes.
- B. Water-Vapor Transmission: Through MVE-control system, maximum 0.06 perm when tested according to ASTM E96/E96M.
- C. Tensile Bond Strength: For MVE-control system, greater than 200 psi with failure in the concrete according to ASTM D7234.
- D. Alkalinity Insensitivity: Insensitivity to alkaline environment up to, and including, pH 14 in a bath test when tested according to ASTM D1308.

2.03 MVE-CONTROL SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Aquafin Building Product Systems.
 - 2. KOSTER American Corporation.
 - 3. Sika Corporation.
 - 4. Synthetics International.
- B. MVE-Control System: ASTM F3010-qualified, fluid-applied, two-component, epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives.
 - 1. Substrate Primer: Provide MVE-control system manufacturer's concrete-substrate primer if required for system indicated by substrate conditions.
 - 2. Cementitious Underlayment Primer: If required for subsequent installation of cementitious underlayment products, provide MVE-control system manufacturer's primer to ensure adhesion of products to MVE-control system.

2.04 ACCESSORIES

- A. Patching and Leveling Material: Moisture-, mildew-, and alkali-resistant product recommended in writing by MVE-control system manufacturer and with minimum of 3000-psi compressive strength after 28 days when tested according to ASTM C109/C109M.

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- B. Crack-Filling Material: Resin-based material recommended in writing by MVE-control system manufacturer for sealing concrete substrate crack repair.
- C. Cementitious Underlayment: If required to maintain manufacturer's warranty, provide MVE-control system manufacturer's cement-based underlayment.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of system indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Preinstallation Testing:
 - 1. Testing Agency: Engage a qualified testing agency to perform tests.
 - 2. Alkalinity Testing: Perform pH testing according to ASTM F710. Install MVE-control system in areas where pH readings are less than 7.0 and in areas where pH readings are greater than 8.5.
 - 3. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Install MVE-control system in locations where concrete substrate MVER exceeds 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Internal Relative Humidity Test: Using in situ probes, ASTM F2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.
 - 4. Tensile-Bond-Strength Testing: For typical locations indicated to receive installation of MVE-control system, install minimum 100-sq. ft. area of MVE-control system to prepared concrete substrate and test according to ASTM D7234.
 - a. Proceed with installation only where tensile bond strength is greater than 200 psi with failure in the concrete.
- B. Concrete Substrates: Prepare and clean substrates according to MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.

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1. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
2. Provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
3. After shot blasting, repair damaged and deteriorated concrete according to MVE-control system manufacturer's written instructions.
4. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
5. Fill surface depressions and irregularities with patching and leveling material.
6. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack-filling material.
7. Allow concrete to dry, undisturbed, for period recommended in writing by MVE-control system manufacturer after surface preparation, but not less than 24 hours.
8. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.

- C. Protect walls, floor openings, electrical openings, door frames, and other obstructions during installation.

3.03 INSTALLATION

- A. Install MVE-control system according to ASTM F3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.
1. Install primers as required to comply with manufacturer's written instructions.
- B. Do not apply MVE-control system across substrate expansion, isolation, and other moving joints.
- C. Apply system, including component coats if any, in thickness recommended in writing by MVE-control system manufacturer for MVER indicated by preinstallation testing.
- D. Cure MVE-control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.
- E. After curing, examine MVE-control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.
- F. Install cementitious underlayment over cured membrane if required to maintain manufacturer's warranty and in thickness required to maintain the warranty.

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3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform installation inspections.
- B. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE-control system is installed without deficiencies.
 - 1. Verify that surface preparation meets requirements.
 - 2. Verify that component coats and complete MVE-control-system film thicknesses comply with manufacturer's written instructions.
 - 3. Verify that MVE-control-system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.
- C. MVE-control system will be considered defective if it does not pass inspections.

3.05 PROTECTION

- A. Protect MVE-control system from damage, wear, dirt, dust, and other contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE-control system manufacturer.
- B. Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or otherwise compromise the MVE-control system membrane.

END OF SECTION

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SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
 - 2. Suspension systems for interior ceilings and soffits.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Load Tables: For non-structural metal framing assemblies indicated to comply with performance requirements and design criteria, provide manufacturers' published load tables annotated to show compliance, for each type of framing assembly.
- C. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of non-structural metal framing; fabrication; and fastening and anchorage details.
 - 2. Indicate framed openings, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CEMCO; California Expanded Metal Products Co.
 - 2. ClarkDietrich Building Systems.
 - 3. SCAFCO Steel Stud Company.
 - 4. Steel Network, Inc. (The).

2.02 PERFORMANCE REQUIREMENTS

- A. Design framing systems in accordance with American Iron and Steel Institute Publication AISI S220, except as otherwise shown or specified.
- B. Performance: Provide non-structural metal framing assemblies capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Load: 5 lbf/sq. ft. uniform air-pressure differential acting perpendicular to covering material supported by metal framing.

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2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Walls Scheduled for Brittle Finishes Including Ceramic Tile: Horizontal deflection greater than $1/360$ of the wall height, and as recommended by wall finish manufacturer.
 - b. Wall Assemblies: Horizontal deflection greater than $1/240$ of the wall height.
 - c. Ceiling Assemblies and Suspension Systems: Vertical deflection greater than $1/240$.
- C. Design framed openings to withstand design loads, gravity loads, and construction tolerances with a maximum deflection not to exceed that recommended by manufacturer of product or system in opening.
- D. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.
- E. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.03 FRAMING SYSTEMS

- A. Thickness: Where metal thickness is indicated, it is a minimum. Provide framing members in thicknesses as needed to comply with requirements indicated.
- B. Framing Members, General: Comply with ASTM C754 for conditions indicated.
 1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
 2. Protective Coating: ASTM A653/A653M, G40 , hot-dip galvanized unless otherwise indicated.
- C. Studs and Tracks: ASTM C645.
 1. Steel Studs and Tracks:
 - a. Minimum Base-Steel Thickness: As indicated on Drawings or if not indicated, as required by performance requirements for horizontal deflection
 - b. Depth: As indicated on Drawings.
- D. Deflection Track System: Where indicated, provide one of the following:
 1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing minimum vertical movement indicated.

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2. Single Long-Leg Track System: ASTM C645 top track with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 3. Double-Track System: ASTM C645 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Steel Thickness: As indicated on Drawings .
- F. Pre-Fabricated Backing System: Manufacturer's proprietary shape used to provide support for wall mounted items, and as follows:
1. Product: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Clark Dietrich Building System:
 - 1) Notched Track.
 - 2) Backer Bar.
 2. Backing System Type: As required to meet performance requirements indicated.
- 2.04 SUSPENSION SYSTEMS
- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.
- B. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- C. Flat Hangers: Steel sheet, in size indicated on Drawings.
- D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
1. Depth: As indicated on Drawings.
- E. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.
 2. Steel Studs and Tracks: ASTM C645.
 - a. Minimum Base-Steel Thickness: 0.0179 inch.
 - b. Depth: As indicated on Drawings.

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2.05 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.03 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.04 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Install studs so flanges within framing system point in same direction.

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- C. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Deflection System Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- D. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.05 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches o.c.
 - 2. Carrying Channels (Main Runners): 48 inches o.c.
 - 3. Furring Channels (Furring Members): 16 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

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3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

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SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.
 - 2. Section 07 92 00 "Joint Sealants" for acoustical sealants installed as part of STC-rated gypsum board assemblies.
 - 3. Section 09 30 00 "Tiling" for backer units installed as substrates for tile.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.03 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for adhesives, indicating VOC content.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.05 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. American Gypsum.
 2. CertainTeed Corp.
 3. Georgia-Pacific Gypsum LLC.
 4. Continental Building Products.
 5. National Gypsum Company.
 6. PABCO Gypsum.
 7. USG Corporation.

2.02 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
1. Adhesives:
 - a. VOC content limits for field applications.
 2. Ceiling Products:
 - a. VOC emissions testing or certification.

2.03 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.04 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M.
1. Thickness: 5/8 inch.
 2. Long Edges: Tapered.

2.05 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
 2. Shapes:

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- a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, Alloy 6063-T5.
 - 3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.06 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
- 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
- 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.07 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
- 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

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- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.03 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: As indicated on Drawings.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) or horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

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3.04 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings and if not indicated, according to ASTM C840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. Bullnose Bead: Use at outside corners.
 - 3. LC-Bead: Use at exposed panel edges.
 - 4. L-Bead: Use where indicated.
 - 5. U-Bead: Use where indicated.
 - 6. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.05 INSTALLATION OF PARTITION CLOSURES

- A. General: Attach end wall cap extrusions to framing with same fasteners used for gypsum panels. Install partition closure assemblies according to manufacturer's written instructions.

3.06 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 4: Surfaces scheduled for light-textured finishes, wallcoverings, flat paints and panel surfaces that will be exposed to view, unless otherwise indicated .
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.

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3. Level 5: Surfaces scheduled for gloss and semigloss coatings, wall and ceiling areas abutting window mullions or skylights, curved surfaces, long hallways, large surface areas flooded with artificial and/or natural lighting and where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.

3.07 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

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SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Ceramic tile.
 - 2. Tile backing panels.
 - 3. Metal edge strips.
- B. Related Sections:
 - 1. Section 07 92 00 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.02 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- D. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Full-size units of each type of trim and accessory for each color and finish required.
 - 3. Metal edge strips in 6-inch lengths.

1.04 INFORMATIONAL SUBMITTALS

- A. Product Test Reports:
 - 1. Slip-resistance test reports from qualified independent testing agency.

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1.05 QUALITY ASSURANCE

- A. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

1.06 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers for Setting and Grouting Materials:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ARDEX Americas.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.
- B. Source Limitations for Setting and Grouting Materials: Obtain setting and grouting materials from single manufacturer and aggregate from single source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
1. Backer units.
 2. Metal edge strips.

2.02 PERFORMANCE REQUIREMENTS

- A. Slip Resistance, Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products in accordance with the following:
1. Level Surfaces, Dry and Wet: DCOF of not less than 0.42 in accordance with ANSI A326.3.

2.03 CERAMIC TILE PRODUCTS

- A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

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- B. Ceramic Tile: Vitreous or impervious natural clay or porcelain; 1/4 inch thick, unless otherwise indicated. As scheduled on Drawings:
 - 1. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as indicated on Drawings, selected from manufacturer's standard shapes:

2.04 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corporation; GlasRoc Tile Backer.
 - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 - c. National Gypsum Company; eXP Tile Backer.
 - d. USG Corporation; Durock Glass-Mat Tile Backerboard.
 - 2. Core: 5/8 inch, Type X.
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.05 SETTING MATERIALS

- A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - 1. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.06 GROUT MATERIALS

- A. Grout Colors: As indicated on Drawings.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3.

2.07 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Profile as indicated, height to match tile and setting-bed thickness, designed specifically for tiling applications.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.

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- 2. Exposed Finish: As selected by Architect from manufacturer's full range.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with dry-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with dry-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

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3.03 INSTALLATION OF TILE BACKING PANEL

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.04 TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with joint widths as recommended by tile manufacturer.
- F. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 - 2. Locate expansion joints as recommended by tile and tile installation material manufacturers, but not less than the following:
 - a. Interior Locations: 20-25 feet in each direction.
 - b. Interior Locations at Above Ground Concrete Slabs: 8-12 feet in each direction.
 - c. Interior Locations Exposed to Direct Sunlight or Moisture: 8-12 feet in each direction.
 - d. Exterior Locations: 8-12 feet in each direction.
 - e. Perimeter joints.

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- G. Metal Edge Strips: Install at locations indicated .

3.05 CLEANING AND PROTECTION

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.
1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
- C. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- D. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- E. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.06 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Wall Installations:
1. Ceramic Tile Over Wood or Metal Studs:
 - a. TCNA W245: Wood or metal studs; Coated glass-mat, water-resistant gypsum backer board.
 - 1) Mortar: Improved modified dry-set mortar.
 - a) Provide thinset mortar unless medium-bed mortar is recommended by tile or mortar manufacturer.
 - 2) Grout: Water-cleanable epoxy grout.

END OF SECTION

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SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

1.03 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for adhesives, indicating VOC content.
 - 2. Documentation for resilient base, indicating compliance with emissions testing or certification.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.05 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

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- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following:
 - 1. Flexco.
 - 2. Johnsonite.
 - 3. Mannington Commercial.
 - 4. Roppe.

2.02 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Adhesives:
 - a. VOC content limits for field applications.
 - 2. Resilient Base:
 - a. VOC emissions testing or certification.

2.03 RESILIENT BASE

- A. Product Standard: One of the following:
 - 1. ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 2. ASTM F1861, Type TP (rubber, thermoplastic).
 - 3. ASTM F1861, Type TV (vinyl, thermoplastic).
- B. Style and Location: As indicated on Drawings.
- C. Thickness: 0.125 inch.
- D. Height: As indicated on Drawings.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Colors: As indicated by manufacturer's designations .

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2.04 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.03 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

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- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.04 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

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SECTION 09 81 00 - ACOUSTIC INSULATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Acoustic blanket insulation.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.03 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.02 ACOUSTIC INSULATION

- A. Acoustic Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Thickness:
 - a. Partitions: As required to fill cavity.
 - b. Above Suspended Ceilings: 12 inches, unless otherwise indicated.
 - 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Partitions:
 - 1) Johns Manville; Unfaced Fiberglass Batts.
 - 2) Owens Corning; Pink Next Gen Sound Attenuation Batts.
 - b. Above Suspended Ceilings:
 - 1) Johns Manville; Unfaced Fiberglass Batts.

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- 2) Owens Corning; Pink Next Gen Sound Attenuation Batts.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness.
- E. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by attaching flanges of insulation to flanges of studs.
 - 5. Where acoustic blankets are indicated for sound attenuation above ceilings, install acoustic blanket insulation over entire ceiling area in thicknesses indicated.

END OF SECTION

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ACOUSTIC INSULATION
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SECTION 09 84 33 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Sound-absorbing wall panels.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.
 - 2. Section 09 77 23 "Fabric-Wrapped Panels" for decorative, fabric-wrapped wall panels that are not required to be tested for acoustical performance.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include panel edge, core material, and mounting indicated.
- B. Shop Drawings: For unit assembly and installation.
 - 1. Include plans, elevations, sections, and mounting devices and details.
- C. Samples: For each exposed product and for each color and texture specified.

1.03 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for wall products, indicating compliance with emissions testing or certification.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

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SOUND-ABSORBING WALL UNITS
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1.06 FIELD CONDITIONS

- A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install units until a permanent level of lighting is provided on surfaces to receive the units.
- C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

PART 2 - PRODUCTS

2.01 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Wall Products:
 - a. VOC emissions testing or certification.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Units to comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested in accordance with NFPA 265 Method B Protocol or NFPA 286.

2.03 SOUND-ABSORBING WALL UNITS

- A. Wood Fiber Wall Panels: Manufacturer's standard panel construction consisting of wood fiber bonded by inorganic binder.

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1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Armstrong World Industries, Inc.
 - b. ASI Architectural.
 - c. Baux.
 - d. Cardinal Acoustics, Inc.
2. Panel Shape: As indicated on Drawings.
3. Mounting: Direct mounted with manufacturer's standard fasteners, secured to substrate.
4. Acoustical Performance: Sound absorption NRC of 0.90 in accordance with ASTM C423 for Type C-20 mounting in accordance with ASTM E795.
5. Nominal Core Thickness: As indicated on Drawings.
6. Panel Width: As indicated on Drawings.
7. Panel Height: As indicated on Drawings.
8. Finish: Custom paint as selected from manufacturer's full color range.

2.04 FABRICATION

- A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.
- B. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

3.03 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.

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3.04 CLEANING

- A. Clean panels on completion of installation to remove dust and other foreign materials in accordance with manufacturer's written instructions.

END OF SECTION

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SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Surface preparation and the application of paint systems on interior and exterior substrates.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 DEFINITIONS

- A. Sheen Levels:
 - 1. Flat: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
 - 2. Eggshell: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
 - 3. Satin: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
 - 4. Semi-Gloss: 35 to 70 units at 60 degrees, according to ASTM D523.
 - 5. Gloss: 70 units and greater at 60 degrees, according to ASTM D523.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include preparation requirements and application instructions.
 - 2. Indicate VOC content.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

1.04 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for paints and coatings, indicating VOC content.

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1.05 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 3 articles for the paint category indicated.
- B. Source Limitations: Obtain products for each coating system from single source from single manufacturer.

2.02 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Paints and Coatings:
 - a. VOC content limits for field applications.

2.03 PAINT PRODUCTS, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As indicated on drawings.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- C. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Galvanized-Metal Substrates:
 - 1. Metal Substrates Galvanized in Accordance with ASTM A 123 and ASTM A 153: Prepare substrates in accordance with ASTM D 6386.

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2. Other Galvanized Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.03 INSTALLATION

- A. Apply paints according to manufacturer's written instructions.
 1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.

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- e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.04 FIELD QUALITY CONTROL

- A. Dry-Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.
- 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.05 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.06 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board; Acrylic Latex: Provide one of the following systems:
- 1. Benjamin Moore:
 - a. Primer: Ultra Spec 500 Interior Latex Primer.
 - b. Intermediate Coat: Same as top coat.
 - c. Top Coat: Ultra Spec 500 Interior.
 - d. Sheen:
 - 1) Walls: Eggshell, unless indicated otherwise.
 - 2) Ceilings: Flat, unless indicated otherwise.
 - 2. Sherwin Williams:
 - a. Primer: ProMar 200 Zero VOC Interior Latex Primer B28 Series.
 - b. Intermediate Coat: Same as top coat.
 - c. Top Coat: ProMar 200 Zero VOC Interior Latex.
 - d. Sheen:
 - 1) Walls: Eggshell, unless indicated otherwise.
 - 2) Ceilings: Flat, unless indicated otherwise.
 - 3. PPG:
 - a. Primer: Speedhide ZERO VOC Interior Latex Primer.
 - b. Intermediate Coat: Same as top coat.

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- c. Top Coat: Speedhide ZERO VOC Interior Latex.
 - d. Sheen:
 - 1) Walls: Eggshell, unless indicated otherwise.
 - 2) Ceilings: Flat, unless indicated otherwise.
- B. Ferrous and Non Ferrous Metals Including: Exposed metal fabrications, steel doors, steel door frames, grilles, panels, stairs, railings, and other miscellaneous metal items indicated; Direct to Metal Acrylic. Provide one of the following systems:
 - 1. Rustoleum Sierra Performance:
 - a. Primer: S-37 System Metalmax DTM Acrylic Urethane.
 - b. Intermediate Coat: None required.
 - c. Top Coat: Same as Primer.
 - d. Sheen: Semi-gloss, unless indicated otherwise.
 - 2. Sherwin Williams:
 - a. Primer: Pro Industrial ProCryl Primer B66-1300.
 - b. Intermediate Coat: None required.
 - c. Top Coat: Pro Industrial Acrylic B66-1151 Series.
 - d. Sheen: Semi-gloss, unless indicated otherwise.
 - 3. PPG:
 - a. Primer: Pitt-Tech Plus EP PRIMER Int/Ext Rust Inhibitive Primer.
 - b. Intermediate Coat: None required.
 - c. Top Coat: 90-1610 Pitt-Tech Plus EP DTM Light Industrial.
 - d. Sheen: Semi-gloss, unless indicated otherwise.
- C. Mechanical And Electric Equipment Items: Insulated Piping Galvanized Ducts, Piping, Conduits, etc.; Ferrous Piping, Hangers (and like items); Electric Panels; and as indicated. Provide one of the following systems:
 - 1. Tnemec:
 - a. One Coat: Uni-Bond DF Series 115; 3.0 DFM.
 - b. Color: White.
 - 2. PPG:
 - a. One Coat: Speedhide Super Tech Interior Dry Fog Flat 6-723XI.
 - b. Color: White.

3.07 EXTERIOR PAINTING SCHEDULE

- A. Ferrous Metal: Exposed steel members, bollards, exposed miscellaneous metal; Urethane. Provide the following system:
 - 1. Tnemec:
 - a. Primer: Zinc-rich polyurethane; Tneme-Zinc 90G-1K97, 2.5 to 3.5 DFM.
 - b. Intermediate Coat: Polyamidoamine epoxy; Series L69 Hi-Build Epoxoline II, 4 to 6 DFM.
 - c. Top Coat: Aliphatic Acrylic Polyurethane; Series 1095 Endura-Shield, 2 to 5 DFM.
 - d. Sheen: Semi-gloss.

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- B. Galvanized Metal: Exposed structural steel members, hollow metal doors and frames, railings, bollards, canopy framing, exposed miscellaneous metal; Urethane. Provide the following system:
1. Tnemec:
 - a. Primer: Polyamidoamine epoxy, Series L69, 4 to 6 DFM.
 - b. Intermediate Coat: Not required.
 - c. Top Coat: Aliphatic Acrylic Polyurethane; Series 1095 Endura-Shield; 2 to 5 DFM.
 - d. Sheen: Semi-gloss.

END OF SECTION

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SECTION 10 11 00 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Sliding visual display units.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For visual display surfaces. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show locations of panel joints.
 - 2. Include sections of typical trim members.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Maintenance Data: For visual display surfaces to include in maintenance manuals.
- E. Warranties: Sample of special warranties.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of motor-operated, sliding visual display units required for this Project.
- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.

1.04 WARRANTY

- A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Surfaces lose original writing and erasing qualities.
 - b. Surfaces exhibit crazing, cracking, or flaking.
 - 2. Warranty Period: Life of the building.

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1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Lighting: Do not install wall covering until a permanent level of lighting is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Glass markerboard assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the glass markerboard assemblies will remain in place without separation of any parts when subjected to the seismic forces specified."

2.02 MATERIALS, GENERAL

- A. Porcelain-Enamel Face Sheet: Manufacturer's standard steel sheet with porcelain-enamel coating fused to steel; uncoated thickness indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Claridge Products and Equipment, Inc.
 - b. PolyVision Corporation; a Steelcase company.
- B. Hardboard: ANSI A135.4, tempered.
- C. Particleboard: ANSI A208.1, Grade M-1.
- D. Fiberboard: ASTM C 208.
- E. Extruded Aluminum: ASTM B 221, Alloy 6063.

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2.03 SLIDING VISUAL DISPLAY UNITS

- A. Horizontal-Sliding Visual Display Units: Factory-fabricated units consisting of extruded-aluminum tubular frame, fixed-rear visual display panel, aluminum-framed horizontal-sliding panels, and extruded-aluminum fascia that conceals overhead sliding track; designed for recessed mounting. Provide panels that operate smoothly without vibration or chatter.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Claridge Products and Equipment, Inc.
 - b. Ghent Manufacturing, Inc.
 - c. PolyVision Corporation; a Steelcase company.
 2. Three-Track Units: Fabricate unit with fixed rear panel covering entire rear surface. Provide three sliding panels, each equal to not less than one-third of overall length of unit.
 3. Four-Track Units: Fabricate unit with fixed rear panel centered in and covering not less than one-half of rear surface, and fixed front panel on each side of unit equal to not less than one-quarter of overall length of unit. Provide four sliding panels, each equal to not less than one-quarter of overall length of unit.
 4. Sliding Panels: Fabricated from not less than 3/8-inch- thick, kraft-paper honeycomb core; designed to be rigid and to resist warpage.
 5. Hardware: Manufacturer's standard, extruded-aluminum overhead track and channel-shaped bottom guides; with two nylon ball-bearing carriers and two nylon rollers for each sliding panel.

2.04 FABRICATION

- A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.
- B. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.
1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.
 2. Provide manufacturer's standard vertical-joint spline system between abutting sections of markerboards.
 3. Provide manufacturer's standard mullion trim at joints between markerboards of combination units.
 4. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.

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- C. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to a neat, hairline closure.
 - 1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.

2.05 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
- B. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display surfaces and wall surfaces.
- B. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- C. Sliding Visual Display Units: Install units in recessed locations and at mounting heights indicated. Attach to casework with fasteners at not more than 16 inches o.c.
 - 1. Adjust panels to operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- D. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room. Cover and protect visual display surfaces.

END OF SECTION

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SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Panel signs.
 - 2. Dimensional characters.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.
 - 2. Division 26 for illuminated, self-luminous, and photoluminescent exit sign units.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Product Schedule: For signs. Use same designations indicated on Drawings or specified.

1.03 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.

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- B. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 PANEL SIGNS

- A. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ACE Sign Systems, Inc.
 - b. Advance Corporation.
 - c. Allen Industries Architectural Signage.
 - d. Allen Markings.
 - e. APCO Graphics, Inc.
 - f. ASE, Inc.
 - g. ASI Sign Systems, Inc.
 - h. Best Sign Systems, Inc.
 - i. Bunting Graphics, Inc.
 - j. Clarke Systems.
 - k. Cosco.
 - l. Diskey Architectural Signage Inc.
 - m. Fossil Industries, Inc.
 - n. Inpro Corporation.
 - o. Mohawk Sign Systems.
 - p. Nelson-Harkins Industries.
 - q. Poblocki Sign Company, LLC.
 - r. Seton Identification Products; a Brady Corporation company.
 - s. Signs & Decal Corp.
 - t. Stamprite Supersine; a division of Stamp Rite Inc.
 - u. Vista System.
 - v. Vomar Products, Inc.
 2. Sign Material: As indicated on Drawings .
 - a. Surface-Applied, Flat Graphics: Applied vinyl film or baked enamel or powder coat.
 - b. Surface-Applied, Raised Graphics: Applied polymer characters and Braille.
 - c. Etched and Filled Graphics: Sign face etched or routed to receive enamel-paint infill.
 3. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: As indicated on Drawings.
 - b. Corner Condition in Elevation: As indicated on Drawings .
 4. Mounting: Manufacturer's standard method for substrates indicated with countersunk flathead through fasteners, unless otherwise indicated.

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2.03 DIMENSIONAL CHARACTERS

- A. Cutout Characters: Characters with uniform faces; square-cut, smoothed edges; precisely formed lines and profiles; and as follows:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. A.R.K. Ramos.
 - b. ACE Sign Systems, Inc.
 - c. APCO Graphics, Inc.
 - d. ASI Sign Systems, Inc.
 - e. Cosco.
 - f. Diskey Sign Company.
 - g. Gemini Signage; Gemini, Inc.
 - h. Matthews International Corporation; Bronze Division.
 - i. Metal Arts.
 - j. Metallic Arts.
 - k. Southwell Company (The).
 - l. Steel Art Company.
 - m. inpro Corporation.
 2. Character Material: Sheet or plate aluminum .
 3. Character Height: As indicated on Drawings.
 4. Thickness: Manufacturer's standard for size of characters indicated.
 5. Finishes:
 - a. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.
 6. Mounting: Concealed, stainless steel back bar or bracket assembly.

2.04 SIGN MATERIALS

- A. Aluminum Castings: ASTM B26/B26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.
- B. Aluminum Sheet and Plate: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Aluminum Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- D. Acrylic Sheet: ASTM D4802, Type UVF (UV filtering).
- E. Polycarbonate Sheet: Coated, mar-resistant, UV-stabilized polycarbonate, with coating on both sides.

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- F. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated on Drawings and suitable for exterior applications.

2.05 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:
1. Use concealed fasteners and anchors unless indicated to be exposed.
 2. For exterior exposure, furnish stainless-steel or hot-dip galvanized devices unless otherwise indicated.
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.06 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 2. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 4. Internally brace signs for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
 5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
 6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.
- B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

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PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
 - 4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Accessible Signage: Install in locations on walls as indicated on Drawings and according to the accessibility standard.
- C. Mounting Methods:
 - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
 - 2. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
 - 3. Back Bar and Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position so that signage is correctly located and aligned.
- D. Remove temporary protective coverings and strippable films as signs are installed.

END OF SECTION

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SECTION 10 28 00 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Washroom accessories.

1.02 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify accessories using designations indicated.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Design accessories and fasteners to comply with the following requirements:
 - 1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2.02 WASHROOM ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated or comparable products by one of the following:
 - 1. AJW Architectural Products.

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2. ASI-American Specialties, Inc.
 3. Bobrick Washroom Equipment, Inc.
 4. Bradley Corporation.
 5. Brey-Krause Manufacturing Co.
 6. Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.
 7. Tubular Specialties Manufacturing, Inc.
- B. Toilet Tissue (Roll) Dispenser:
1. Products: Provide one of the following:
 - a. Bobrick Washroom Equipment, Inc.; B-6977.
 - b. Bradley Corporation; 5124-52.
 2. Description: Double-roll dispenser.
 3. Mounting: Recessed.
 4. Operation: Noncontrol delivery with standard spindle.
 5. Capacity: Designed for 5-inch- diameter tissue rolls.
 6. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
- C. Paper Towel (Folded) Dispenser:
1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc.; B-262.
 2. Mounting: Surface mounted.
 3. Minimum Capacity: 400 C-fold or 525 multifold towels.
 4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
 5. Lockset: Tumbler type.
 6. Refill Indicator: Pierced slots at sides or front.
- D. Soap Dispenser:
1. Basis-of-Design Product: Baobrick Washroom Equipment, Inc.; B-4112.
 2. Description: Designed for manual operation and dispensing soap in liquid or lotion form.
 3. Mounting: Horizontally oriented, surface mounted.
 4. Capacity: 40 fl oz.
 5. Refill Indicator: Window type.
- E. Grab Bar:
1. Products: Provide one of the following:
 - a. Bobrick Washroom Equipment, Inc.; B-6806 Series.
 - b. Bradley Corporation; 812 Series.
 2. Mounting: Flanges with concealed fasteners.
 3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin).
 4. Outside Diameter: 1-1/2 inches.
 5. Configuration and Length: As indicated on Drawings.
- F. Sanitary-Napkin Disposal Unit:
1. Products: Provide one of the following:
 - a. Bobrick Washroom Equipment, Inc.; B-270.
 - b. Bradley Corporation; 4781-11.

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2. Mounting: Surface mounted.
3. Door or Cover: Self-closing, disposal-opening cover.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

G. Seat-Cover Dispenser:

1. Products: Provide one of the following:
 - a. Bobrick Washroom Equipment, Inc.; B-4221.
 - b. Bradley Corporation; 5A40-11.
2. Mounting: Surface mounted.
3. Exposed Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

H. Mirror Unit:

1. Products: Provide one of the following:
 - a. Bobrick Washroom Equipment, Inc.; B-165.
 - b. Bradley Corporation; 781.
2. Frame: Stainless steel channel.
 - a. Corners: Manufacturer's standard.
3. Size: 18 by 36 inches.

2.03 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to comply with specified structural-performance requirements.

3.02 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

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END OF SECTION

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SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.
 - 2. Portable fire extinguishers.
 - 3. Mounting brackets for fire extinguishers

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
 - 2. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.
- B. Samples: For each type of exposed finish required.
- C. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.03 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.04 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

1.05 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Six years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.
- B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.03 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
- B. Cabinet Construction: Nonrated.
- C. Cabinet Material: Stainless steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.
- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
 - 1. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.
 - 2. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.
- F. Cabinet Trim Material: Same material and finish as door.
- G. Door Material: Stainless steel sheet.
- H. Door Style: Vertical duo panel with frame.
- I. Door Glazing: Tempered float glass (clear).
- J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

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1. Provide recessed door pull and friction latch.
2. Provide continuous hinge, of same material and finish as trim,, permitting door to open 180 degrees.

K. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location..
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.

L. Materials:

1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.
 - a. Finish: ASTM A480/A480M No. 4 directional satin finish, .
2. Tempered Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.04 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
1. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
 2. Valves: Manufacturer's standard.
 3. Handles and Levers: Manufacturer's standard.
 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type: UL-rated nominal capacity as indicated, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.
1. For Classroom Use: 3-A:40-B:C, 5-lb.
 2. For Shop Use: 4-A:60-B:C, 10-lb.

2.05 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

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1. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

2.06 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 1. Weld joints and grind smooth.
 2. Miter corners and grind smooth.
 3. Provide factory-drilled mounting holes.
 4. Prepare doors and frames to receive locks.
 5. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
 2. Fabricate door frames of one-piece construction with edges flanged.
 3. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.07 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.03 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
 - 2. Provide inside latch and lock for break-glass panels.
 - 3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

3.04 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

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SECTION 10 56 13 - METAL STORAGE SHELVING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Four-post metal storage shelving.

1.02 COORDINATION

- A. Coordinate sizes and locations of blocking and backing required for installation of metal storage shelving attached to wall and ceiling assemblies.
- B. Coordinate locations and installation of metal storage shelving that may interfere with ceiling systems including lighting, HVAC, speakers, sprinklers, access panels, electrical switches or outlets, and floor drains.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For metal storage shelving.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include installation details of connectors, lateral bracing, and special bracing.
- C. Delegated-Design Submittal: For seismic restraint of metal storage shelving.

1.04 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Certificates: For metal storage shelving, accessories, and components, from manufacturer.

1.05 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal storage shelving, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

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- B. Seismic Performance: Metal storage shelving shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.02 FOUR-POST METAL STORAGE SHELVING

- A. Open and Closed Four-Post Metal Storage Shelving: Complying with MH 28.1 and field assembled from factory-formed components. Shelves span between supporting corner posts that allow shelf-height adjustment over full height of shelving unit. Provide fixed top and bottom shelves, adjustable intermediate shelves, and accessories indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Lyon LLC, 8000 Series, or comparable product by one of the following:
 - a. Aurora Storage Products, Inc.
 - b. Borroughs Corporation.
 - c. Durham Manufacturing Company (The).
 - d. EQUIPTO.
 - e. Edsal Manufacturing Company, Inc.
 - f. Excalibur Wood Products.
 - g. Hodge.
 - h. Interlake Mecalux.
 - i. Jeter; a TAB Company.
 - j. Karp Associates, Inc.
 - k. List Industries Inc.
 - l. Montel Inc.
 - m. Penco Products, Inc.
 - n. Republic Storage Systems, LLC.
 - o. Rousseau Metal Inc.
 - p. Safco Products Company.
 - q. Schaefer Systems International, Inc.
 - r. Spacefile International Corp.
 - s. Spacesaver Corporation.
 - t. Tennsco.
 - u. UNICOR, Federal Prison Industries, Inc. (FPI).
 - v. Western Pacific Storage Systems.
2. Load-Carrying Capacity per Shelf: 1250 lb.
3. Posts: Fabricated from hot-rolled steel; in T shape; with perforations at 1-1/2 inches o.c. to receive shelf-to-post connectors.
 - a. Unit Configuration: Configure shelving units as individual, freestanding assemblies.
 - 1) Add-On Shelf Posts: Fabricated from hot-rolled steel, manufacturer's standard shape; perforated to match main posts.
 - b. Post Base: Adjustable steel floor plate, drilled for floor anchors.
4. Bracing: Manufacturer's standard, double diagonal cross bracing.
 - a. Location: At unit back and ends as required for stability, load-carrying capacity of shelves, and number of shelves indicated.
5. Back Panel: One piece fabricated from cold-rolled steel sheet.
6. End Panels: Fabricated from cold-rolled steel sheet.

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7. Solid-Type Shelves: Uncoated steel sheet.
 - a. Slots or Holes for Shelf Dividers: 1 inch o.c.
 - b. Fabricate fronts and backs of shelves with box-formed edges, with corners lapped and welded.
8. Shelf-to-Post Connectors: Manufacturer's standard connectors.
9. Base: Open, with exposed post legs.
10. Accessories:
 - a. Finished End Panels: Fabricated as solid full-height panels from manufacturer's standard thickness cold-rolled steel sheet and with same finish as posts, with trim for a finished appearance along edges abutting posts and top shelf.
 - b. Shelf Dividers: Fabricated from same material and with same finish as shelves; full-height type.
 - c. Swinging Doors:
 - 1) Product: Lyon LLC; Double Swinging Doors for 8000 Series Shelving; Model 8837.
11. Steel Finish: Powder coat.
 - a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.03 ANCHORS

- A. Floor Anchors: Galvanized-steel, post-installed expansion anchors. Provide number per unit recommended by manufacturer unless additional anchors are indicated in calculations.
- B. Wall Anchors: Manufacturer's standard, galvanized-steel anchors designed to secure metal storage shelving to adjacent wall. Provide two per shelving unit for each shelving unit adjacent to a wall unless additional anchors are indicated in calculations.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install metal storage shelving level, plumb, square, rigid, true, and with shelves flat and free of dents or distortion. Make connections to form a rigid structure, free of buckling and warping.
 1. Install exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
 2. Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.
 3. Adjust post-base bolt leveler to achieve level and plumb installation.
 4. Anchor shelving units to floor with floor anchors through floor plate. Shim floor plate to achieve level and plumb installation.
 5. Install seismic restraints.
 6. Connect side-to-side shelving units together.
 7. Install shelves in each shelving unit at equal spacing.

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- a. Four-Post Metal Storage Shelving: Install four clips, one at each post, for support of each shelf; with clips fully engaged in post perforations.

3.02 ERECTION TOLERANCES

- A. Erect four-post metal storage shelving to a maximum tolerance from vertical of 1/2 inch in up to 10 feet of height, not exceeding 1 inch for heights taller than 10 feet.

3.03 ADJUSTING

- A. Adjust metal storage shelving so that connectors and other components engage accurately and securely.
- B. Adjust and lubricate operable components to operate smoothly and easily, without binding or warping. Check and readjust operating hardware.
- C. Touch up marred finishes or replace metal storage shelving that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal storage shelving manufacturer.
- D. Replace metal storage shelving components that have been damaged beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 12 35 59 - DISPLAY CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Grooved wood composite panels machined for use with inserts and display hardware.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that paneling can be installed as indicated.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For paneling.
 - 1. Include plans, elevations, sections, trim members, and attachment details.
- C. Samples for Verification:
 - 1. Submit 6 by 10 inches section of each panel type indicating the color, texture, and pattern required.

1.04 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for installation adhesives, indicating VOC content.
 - 2. Documentation for composite wood products, indicating compliance with emissions testing or certification.

1.05 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For display casework to include in maintenance manuals.

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1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver paneling until painting and similar operations that might damage paneling have been completed in installation areas. Store paneling in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install paneling until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Marlite.
 - 2. Spacewall.
 - 3. Wind Mill Slatwall Products.

2.02 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Adhesives:
 - a. VOC content limits for field applications.
 - 2. Composite Wood Products:
 - a. Formaldehyde emissions testing or certification.

2.03 PANEL

- A. Panel Configuration: Engineered groove machined into wood composite substrate.
 - 1. Panel Thickness: 3/4 inches thick with nominal 1/2 inch deep slotted groove.
 - 2. Panel face dimensions: As indicated on the drawings.
 - 3. Slatwall panels grooves machined on centers as indicated on Drawings.

2.04 PANEL FINISHES

- A. High Pressure Laminate: Vertical grade 0.030 inch thick high pressure plastic laminate adhered to wood fiber substrate by cold pressing polyvinyl acetate (PVA) type II, water resistant adhesives.
 - 1. Edges: Square, and sealed, to provide a black edge.

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2. Balancing Backer: Kraft Paper that does not contribute to or pose an unusual additional fire hazard.
3. Color and Pattern: As indicated on Drawings.

2.05 MATERIALS

- A. Materials, General: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.
 1. MDF: ANSI A208.2, Grade 130.
 2. Particleboard (Medium Density): ANSI A208.1, Grade M-2.

2.06 INSTALLATION MATERIALS

- A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls.
- B. Installation Adhesive: Product recommended by panel fabricator for each substrate for secure anchorage.

2.07 FABRICATION

- A. Complete fabrication, including assembly, to maximum extent possible, before shipment to Project site.
- B. Shop cut openings, to maximum extent possible, to receive hardware, electrical work, and similar items.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Before installation, condition paneling to humidity conditions in installation areas.

3.02 INSTALLATION

- A. Install panels level, plumb, true in line, and without distortion in accordance with the manufacturer's installation instructions.
 1. Anchor units rigidly and securely in place.
- B. Anchor paneling to supporting substrate with blind nailing.
 1. Where screws do not hit the studs, fasten with adhesive in accordance with the manufacturer's recommendations.

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3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective paneling, where possible, to eliminate defects. Where not possible to repair, replace paneling. Adjust for uniform appearance.
- B. Clean paneling on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

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SECTION 12 36 00 - COUNTERTOPS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad countertops.
 - 2. Wood countertops.
- B. Related Sections:
 - 1. Division 01 sustainable design requirements Section(s) for supplementary sustainable design criteria.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.
 - 2. Show locations and sizes of cutouts and holes for items installed in countertops.
- C. Samples for Verification: As follows:
 - 1. Countertops: For each type, color, pattern, and surface finish required, 12 by 12 inches in size.

1.03 INFORMATIONAL SUBMITTALS

- A. Sustainable Design Submittals:
 - 1. Documentation for composite wood products, indicating compliance with emissions testing or certification.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

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- B. Quality Standard: Unless otherwise indicated, comply with WI's North American Architectural Woodwork Standards (NAAWS) for grades indicated for construction, finishes, installation, and other requirements.
 - 1. Where the Contract Documents contain requirements that are more stringent than the referenced quality standard, comply with requirements of the Contract Documents in addition to those of the referenced quality standard.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.01 SUSTAINABLE DESIGN CRITERIA

- A. Sustainable Design Criteria: Comply with indicated criteria for the following product categories:
 - 1. Composite Wood Products:
 - a. Formaldehyde emissions testing or certification.

2.02 PLASTIC-LAMINATE-CLAD COUNTERTOP MATERIALS

- A. Grade: Custom.
- B. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS .

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- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated by manufacturer's designations.
- D. Edge Treatment: 3.0-mm PVC edging.
- E. Core Material: MDF.
- F. Core Material at Sinks: MDF made with exterior glue.
- G. Core Thickness: 3/4 inch.
 - 1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.
- H. Paper Backing: Provide paper backing on underside of countertop substrate.

2.03 WOOD COUNTERTOPS

- A. Grade: Custom.
- B. Butcher-Block Countertops: For transparent finish. Fabricated from narrow strips of lumber glued together and arranged for random mix of color and grain.
 - 1. Wood Species: As selected by Architect.
 - 2. Strip Thickness: As selected by Architect.

2.04 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
 - 1. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.

2.05 FABRICATION

- A. Fabricate countertops according to plastic laminate material manufacturer's written instructions and to the WI's "North American Architectural Woodwork Standards."
 - 1. Grade: Custom.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

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- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.02 COUNTERTOP INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
 - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
 - 1. Secure field joints in countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a 1/8-inch-in-96-inches variation from a straight, level plane.
 - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.

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3. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION

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SECTION 21 00 00 – FIRE SUPPRESSION

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the fire suppression system on this project.
- B. Work Included
 - 1. Furnish and install a complete fire sprinkler system for this project. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that all items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
 - 2. Site and System Investigation: The bidding contractor for the fire sprinkler system shall visit the site prior to the bid and become thoroughly knowledgeable about the existing system and work required to perform work of this section. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.

1.02 REFERENCES AND STANDARDS

- A. California Building Code (CBC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA)
- B. California Fire Code (CFC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA)
- C. American Society of Civil Engineers (ASCE): ASCE 7
- D. National Fire Protection Association (NFPA): 13
- E. Underwriter Laboratories, Inc. (UL)

1.03 SUBMITTALS

- A. Product Data
- B. Shop Drawings
 - 1. Unless otherwise approved or deviates from stamped approved fire suppression plans, provide Fire Suppression Shop Drawings with current C-16 installing contractor stamp for review and approval.
 - 2. Specifically note specified features and performance data on submittal.
 - 3. The Engineer will review the original submittal and one resubmittal for the same product. Additional resubmittals will be reviewed on an hourly rate, payable by the contractor.

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4. Partial submittals or submittals not properly formatted as indicated above are subject to return without review for the contractor to correct.
 5. Clearly reference on the drawings which products will require special inspection.
- C. Shop Drawings, Calculations, component manufacturer's data sheets: Submit as one complete standalone package to AHJ, and Engineer. Drawings to show information required by NFPA 13, including room names and occupancy classifications. Refer to individual Specification Sections for additional requirements for the shop drawings, calculations and specific items required in product data submittal.
1. Shop Drawings: Provide shop drawings which include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and the like.
 2. Calculations: Hydraulic (Provide 10% Buffer), sway brace, and the like calculations.
 3. Product Data: Submit manufacturer's technical data, installation instructions and dimensioned drawings for products, sprinklers, equipment and devices installed, supplied or provided.
 4. Maintain an updated product submittal package to be included in the final operation and maintenance documentation.
- D. Operation and Maintenance (O&M) Manuals
1. Copies of certificates of code authority acceptance, code-required acceptance tests; test reports, parts lists, maintenance information for equipment, valves, and other special guarantees, certificates of warranties, and the like, specified elsewhere herein or indicated on Drawings. Record Drawings, water supply flow test, calculations, manufacturer's data sheets and operation and maintenance instructions, servicing requirements, test reports and certificates, Contractor's Material and Test Certificates for Aboveground Piping.
- E. As-Built Drawings
1. Show changes and deviations from the Drawings. Include issued Addendum and change order items.
 2. Make changes to the Drawings in a neat, clean, and legible manner.
- F. Field Test Reports
- G. Warranty
1. General: Provide written warranty on fire suppression work, agreeing to replace/repair inadequate and defective materials and quality of work, including leakage, breakage, improper assembly and failure to perform as required for a period of one year from date of Owner's acceptance. Include separate product warranties as indicated for specific parts or products in work. Provide warranty signed by both Installer and Contractor.
 2. Include manufacturer's standard product warranty, covering fire suppression equipment operation under normal conditions and use, where installed, operated and maintained in accordance with manufacturer's instructions. Provide product warranty period terminating 12 months after Owner's acceptance.

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1.04 QUALITY ASSURANCE

- A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.
- C. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

PART 2 - PRODUCTS

2.01 HAZARDOUS MATERIALS

- A. Do not use products containing asbestos, lead, or other material defined by EPA as hazardous to human or animal life.

2.02 MATERIALS

- A. Base contract upon furnishing materials as specified. Materials, equipment, and sprinklers used for construction are to be new, the latest products as listed in manufacturer's printed catalog data and are to be UL or FM approved or acceptable by state, county, and city authorities.
- B. Materials, sprinklers, and equipment of a kind to be standard product of one manufacturer and of current manufacture.
- C. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

2.03 PIPE AND FITTINGS FOR FIRE SPRINKLER SYSTEM

- A. Aboveground Inside Building Piping:
 - 1. Pipe Size 2-Inch Diameter and Smaller: ASTM A53, ASTM A135, or ASTM A795; minimum CRR of 1.00 per UL listing or FM Global approval. Allied BLT/XL is not permitted.

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2. Pipe Size 2-1/2-Inch Diameter and Larger: ASTM A53, ASTM A135, or ASTM A795; minimum CRR of 1.00 per UL Testing or FM Global approved, wall thickness greater than Schedule 5 (Schedule 5 not approved).

B. Mechanical Couplings: UL approved; Victaulic, Gruvlok, or approved.

C. Mechanical Gaskets: EPDM, Vic-Plus, Grade E+, or approved.

D. In-Building Riser: single extended 90 degree fitting of fabricated stainless steel tubing, maximum working pressure 200 psi. Grooved-end connection on building outlet side and CIPS coupler on underground inlet side. Ames In-Building Riser, or approved.

E. Seismic Expansion Loop: Two flexible sections for hose and braid. Metraflex FireLoop, or approved.

2.04 VALVES FOR FIRE SPRINKLER SYSTEM

A. Swing Check: Victaulic 717R with main drain and all associated gauge assemblies or approved equal, grooved end.

B. Butterfly Valves: Victaulic 705 wired for monitoring or approved equal, grooved end.

C. Drain and Test: AGF 1011T with pressure relief or approved equal.

D. Drain: Globe type, UL listed for fire service.

2.05 FIRE SPRINKLERS

A. Pendent Style Sprinklers: UL listed for fire service, locate in all Acoustical Ceiling Tile and Finished Gyp. Board ceilings shall be of the type of a semi-recessed, White polymer finish sprinkler and White polymer escutcheon or the appropriate temperature to be quarter pointed in 2 x 4 Acoustical Ceiling Tiles.

B. Upright Style Sprinklers: UL listed for fire service, locate in all exposed areas without finished ceilings, i.e, shop space, storage areas, etc. Brass finish of the appropriate temperature.

2.06 SPECIALTY PRODUCTS FOR FIRE SPRINKLER SYSTEM

A. Pressure Gauges: 3.5-inch, Bourdon tube or spring type, 0 to 300 PSI. Ashcroft 1005P-XUL, US Gauge 1590K, or approved,

B. Waterflow Detector: Vane-type; SPDT switches; adjustable time delay (0 to 75 seconds). Potter VSR-F, or approved.

C. Supervisory Switches: Compatible with valve (OS&Y gate, butterfly, or PIV); SPDT switches. Potter, or approved.

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- D. Alarm Bells - Exterior: Minimum 90 dBA at 10 feet. Potter PB 10-inch, or approved.
- E. Sway Bracing: From one manufacturer. Tolco, Afcon, Caddy or approved.
- F. Attachments: UL listed and in compliance with loads associated with line and main piping.

2.07 CONNECTIONS FOR FIRE SPRINKLER SYSTEM

- A. Fire Department Connection: Free-standing type; brass finish; 4" x 2-1/2" x 2-1/2" size; thread to match fire department hardware; dust cap of same material and finish; marked "Auto Sprinkler Fire Department Connection."

PART 3 - EXECUTION

3.01 ACCEPTANCE

- A. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:
 - 1. Testing reports including Contractor's Material and Test Certificate for Underground Piping, Contractor's Material and Test Certificate for Aboveground Piping, Contractor's Material and Test Certificate for Private Fire Service Mains.
 - 2. Cleaning
 - 3. Final acceptance by Project Inspector
 - 4. Operating and Maintenance Manuals
 - 5. Training of operating personnel
 - 6. Record Drawings
 - 7. Guarantee certificates
 - 8. Letter of conformance

3.02 LETTER OF CONFORMANCE

- A. Provide letter of conformance and copies of manufacturers' warranties and extended warranties with a statement in letter that fire suppression items were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include letter of conformance and copies of manufacturers' warranties and extended warranties in operating and maintenance manuals.
- B. Warranties to begin at date of substantial completion.

END OF SECTION

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SECTION 23 01 00 – BASIC PLUMBING

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the basic requirements for the plumbing work on this project
- B. Work Included
 - 1. Furnish and install a fully functional plumbing system including all equipment, fixtures, piping, controls and other material as shown on in the Plumbing Drawings and specified herein. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that any plumbing accessories, valves, devices, controls or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.

1.02 REFERENCES AND STANDARDS

- A. California Plumbing Code (CPC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. Occupational Safety and Health Administration (OSHA)

1.03 SUBMITTALS

- A. Product Data
- B. Operation and Maintenance (O&M) Manuals
- C. Field Test Reports

1.04 QUALITY ASSURANCE

- A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.

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- C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:
1. California Plumbing Code (CPC)
 2. California Building Code (CBC)
 3. California Green Building Code (CGC)
 4. California Fire Code (CFC)
 5. California Energy Code (CENC)
 6. California Mechanical Code (CMC)
 7. California Electrical Code (CEC)
- D. Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:
1. ACI American Concrete Institute
 2. ANSI American National Standards Institute
 3. ASTM American Society for Testing Materials
 4. ASME American Society of Mechanical Engineers
 5. AWS American Welding Society
 6. CSA CSA Group
 7. FS Federal Specification
 8. UL Underwriters' Laboratories
- E. All base material shall be ASTM and/or ANSI standards.
- F. All plumbing devices and appliances furnished under this Section shall conform to CPC standards and bear the UL label where such label is applicable.
- G. Certify that each welder performing Work has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

PART 2 - PRODUCTS

- A. See Fixture Schedule in Plumbing Drawings

PART 3 - EXECUTION

3.01 ROUGH-IN

- A. Contractor shall verify lines, levels and dimensions indicated on the construction document drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.
- B. Verify final locations for rough-ins with field measurements and with the requirements for the actual equipment to be connected.

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- C. Refer to equipment specifications in other sections for equipment rough-in requirements.

3.02 INSTALLATION

- A. Preparation, sequencing, handling, and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified.
- B. Comply with Manufacturer Shop Drawings.
- C. Verify all dimensions by field measurements.
- D. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for plumbing installations.
- E. Coordinate the installation of required supporting devices, pipes, and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
- F. Sequence, coordinate and integrate installations of plumbing materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- G. Where mounting height is not detailed or dimensioned, contact the Architect for direction prior to proceeding with rough-in.
- H. Coordinate connection of plumbing systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies and controlling agencies. Provide required connection for each service.
- I. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the construction documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
- J. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
- K. Install plumbing equipment and devices to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- L. Coordinate plumbing systems, equipment, and materials installations with other building components.

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- M. Provide access panel or doors where devices or equipment are concealed behind finished surfaces.
- N. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.

3.03 CUTTING, PATCHING, PAINTING, AND SEALING

- A. Structural members shall in no case be drilled, bored, or notched in such a manner that will compromise their structural integrity. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.
- B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- C. Application of joint sealers:
 - 1. General: Comply with joint sealer Manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.
 - 2. Installation of fire-stopping sealant: Install sealant, including forming, packing and other accessory materials, to fill openings around plumbing services penetrating floors and walls, to provide fire-stops and fire-resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

3.04 FIELD QUALITY CONTROL

- A. General testing requirements:
 - 1. The purpose of testing is to ensure that all tested plumbing equipment, both Contractor and Owner supplied, is operational and within industry and Manufacturer's tolerances and is installed in accordance with design Specifications.
 - 2. Tests and inspections shall determine suitability for acceptance.
 - 3. Perform tests in presence of the Owner's Representative and furnish test equipment, facilities and technical personnel required to perform tests.
 - 4. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications.
- B. Tests: In addition to specific system test described elsewhere, tests shall include:
 - 1. Domestic Water System, refer to Section 22 1116
 - 2. Sanitary Waste and Vent System, refer to Section 22 1316
 - 3. Energy Code Acceptance Tests
- C. Testing safety and precautions:
 - 1. Safety practices shall include the following requirements:
 - a. Applicable State and Local safety operating procedures.
 - b. OSHA

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- D. Calibration of test equipment:
 - 1. Testing Agency shall have calibration program that assures test instruments are maintained within rated accuracy.
 - 2. Instruments shall be calibrated in accordance with the following frequency schedule:
 - a. Field instruments: Analog, 6 month maximum; Digital, 12 months maximum.
 - b. Laboratory instruments: 12 months.
 - c. Leased specialty equipment: 12 months where accuracy is guaranteed by lessor.
 - 3. Dated calibration labels shall be visible on test equipment.
 - 4. Records, which show date and results of instruments calibrated or tested, must be kept up-to-date.
 - 5. Up-to-date instrument calibration instructions and procedures shall be maintained for test instrument.
 - 6. Calibration standards shall be of higher accuracy than instrument tested.
 - 7. Equipment used for field testing shall be more accurate than instrument being tested.
- E. Coordinate with General Contractor regarding testing schedule and availability of equipment ready for testing.
- F. Notify Owner one week in advance of any testing.
- G. Any products which fail during the tests or are ruled unsatisfactory by the Owner's Representative shall be replaced, repaired, or corrected as prescribed by the Owner's Representative at the expense of the Contractor. Tests shall be performed after repairs, replacements or corrections until satisfactory performance is demonstrated.
- H. Testing Agency shall maintain written record of tests and shall assemble and certify final test report. All test results/reports shall be submitted to the Mechanical Engineer for review.
- I. Include all test results in the maintenance manuals.

3.05 CLEANING

- A. Prior to starting up plumbing equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.
- B. Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all plumbing equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.

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- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

END OF SECTION

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SECTION 22 11 00 – PLUMBING PIPING

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the plumbing piping for this project
- B. Work Included
 - 1. Furnish and install piping for the following systems
 - a. Domestic Water
 - b. Sanitary Sewer and Venting
 - c. HVAC Condensate
 - d. Roof drainage
 - e. Process piping for gas welding equipment
 - 2. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that any plumbing accessories, valves, devices, controls or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.

1.02 REFERENCES AND STANDARDS

- A. California Plumbing Code (CPC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Mechanical Code (CMC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. American Society of Mechanical Engineers (ASME)
 - 1. AMSE B1.20.1 - Standard on Pipe Threads, General Purpose, Inch
- D. American Society for Testing and Materials (ASTM)
 - 1. B32 - Standard Specification for Solder Metal.
 - 2. B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.
 - 3. B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.
 - 4. D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 - 5. D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
 - 6. D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping.
 - 7. E11 - Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves.

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- 8. F402 - Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings.
- 9. F645 - Standard Guide for Selection, Design, and Installation of Thermoplastic Water-Pressure Piping Systems.

E. Cast Iron Soil Pipe and Fittings Handbook (CISPI)

F. CDA Copper Tube Handbook

1.03 SUBMITTALS

- A. Shop Drawings: Submit showing parts, connections and anchorages, adjacent materials, fully dimensioned and noted.
- B. Product Data: Submit list of each required accessory and complete descriptive data of products proposed for use. Include manufacturer's specifications, published warranty, installation instructions, and maintenance instructions.

1.04 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. Use materials and products of one manufacturer whenever possible.
- C. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Project Inspector. Work not so inspected is subject to uncovering and replacement.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

- A. See Piping Schedule in Plumbing Drawings

2.02 BEDDING AND BACKFILL MATERIAL

- A. Granular Material: Crushed stone or pea gravel which will pass the 12.5 mm (1/2-inch) sieve but will be retained on the 4.75 mm (No. 4) sieve (U.S.A. Standard Series).
- B. Sieves: ASTM E11
- C. Sand: Natural particles of granular material which does not contain excessive amounts of clay, silt, or organic material, passing a 9.5 mm (3/8-inch) sieve. Sand found on the job site may be used if it is approved by the Architect.

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PART 3 - EXECUTION

3.01 UNDERGROUND PIPING INSTALLATION

A. Trench Excavation

1. Excavate trenches so that piping may be laid correctly in line and grade. Remove any large rocks or other debris encountered in the excavation and dispose of appropriately.
2. Excavate to a sufficient depth and width to provide adequate room for construction and installation of the work except that the width of the trench from the pipe invert to a point 300 mm (twelve inches) above the top of the pipe shall not be greater than 760 mm (30 inches).
3. Where it is impossible to maintain proper line and grade, excavate below grade and replace the bedding with compacted sand.

B. Excavation for Structures

1. Make excavation for structures such as manholes, sumps, interceptors and basins, to the depth required for pouring or placing the base slab. Whenever possible, rest the base on the natural surface of the excavation with a minimum amount of compacted sand-cement mixture to be used for leveling. In no case will more than 75 mm (three inches) of sand-cement mixture be permitted under a base slab and if ground conditions or excess excavation causes need for more than 75 mm (three inches) of fill or leveling course; provide sand fill, compacted in place.
2. Excavate for a structure only wide enough to allow proper mortaring or pointing of joints or wide enough for forms which may be necessary.

C. Sheet piling, Bracing, and Shoring

1. Provide and maintain sheet piling, bracing and shoring required to provide substantial support for the sides of excavations and trenches to prevent movement of the soil or edges of the trench, to protect the construction work and ensure the safety of the workers.
2. As the trench is backfilled, remove supports in such a manner as to prevent the caving in of the sides of the trench or damage to the pipe or structures.

D. Underpinning

1. Where excavation work is required under or adjacent to existing footings, under-pin as required to adequately support existing construction in such a manner as to avoid raising or lowering or otherwise damaging existing construction.

E. Removal of Water

1. Keep excavations as dry as possible until backfill has been completed above the pipe. In ground containing excessive amount of water, provide and maintain such pumps and associated pipes and connections as are necessary to remove the water from the trench and assure safe, proper construction of the piping system.

F. Bedding

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1. Provide Class "B" bedding for piping inside the building, consisting of a layer of granular material with a minimum thickness of 100 mm (four inches) and a maximum thickness of 150 mm (six inches) below the bottom of the pipe barrel. Extend the bedding to a minimum depth of 300 mm (12 inches) over the top of the pipe.
2. Place sand-gravel cover in 150-mm (six-inch) layers, mechanically compacted to 95 percent of maximum density as determined by ASTM D1557.
3. Firmly support a given segment of the bottom of the pipe. The segment, as a minimum, shall be equal to five-tenths of the outside diameter of the barrel, and shall be uniformly supported by direct contact with firm bedding. Excavate bell holes at proper intervals so that no part of the load on the pipe is supported by the bells.

G. Pipe Laying

1. Lay piping only in filled or disturbed earth after it has been compacted to properly support general construction.
2. Lay pipe in dry and clean trenches.
3. Inspect pipe and fittings for defects prior to being lowered into the trench and clean both inside of the bell and outside of the spigot.
4. Lay pipelines straight and in true alignment with the grade and location established.
5. Install cast iron storm, sub-surface drain collector and sanitary drainage systems in accordance with manufacturer's recommendations.

H. PEX Pipe

1. Install underground PEX tubing in accordance with ASTM D2774 and ASTM F645.

I. PVC DWV Pipe

1. Install PVC DWV underground plastic drainage piping in accordance with ASTM D2321.
2. Comply with the procedures in ASTM F402 for safe handling during joining of plastic pipe and fittings with solvent cements.

J. Sanitary and Storm Drain Piping

1. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
2. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
3. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other

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installation requirements. Maintain swab in piping and pull past each joint as completed.

4. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 - a. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
 - b. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 - c. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
5. Install force mains at elevations indicated.

K. Sub-Surface Drain Piping

1. General
 - a. Install subsurface drainage as a complete system.
 - b. Clean drainpipe with water, removing all debris and extraneous materials to ensure unobstructed flow.
 - c. Keep trenches dry during installation of drainage system. Make changes in direction of drain lines with 1/8 bends. Use fittings at intersections. Provide temporary pumping of the foundation drainage system, maintaining the system active until final connection to the building and site drainage system is completed.
2. Bedding and filter: Place graded aggregate and filter bedding, minimum 6 inches in depth, on the filter fabric which has been placed on compacted subgrade. Place aggregate filter about 150 mm (6 inches) thick around the tile, prior to wrapping the tile and aggregate filter with filter fabric. Lap filter fabric end 300 mm (12 inches) on top of the pipe and along the pipe length at the joints of the fabric. Rest each section of pipe firmly upon the bedding, through the entire length, with recess formed for bell joints.
3. Filter screen: Provide filter screen to retain filter aggregate at end of the pipe. Filter screen: 300-mm-wide (12-inch-wide) band of stainless-steel fabric having 3-mm (1/8-inch) openings, wrapped and tied securely with wire around the end of the drainpipe systems at the high point.
4. Pipe laying: Lay drain lines to true grades and alignment, with a continuous fall in the direction of flow. Face bells of pipe sections upgrade. Clean interior of pipe thoroughly before being laid. When drain lines are left open for connection to discharge line, temporarily close the open ends and mark the location with wooden stakes. Lay perforated pipe with perforations facing down. Remove and re-lay any length that has had its grade or joints disturbed.

L. Backfilling

1. Place and compact backfill so that subsequent harmful settlement will not occur and the installation of concrete floor slabs may proceed after completion. Begin backfilling as required at the bedding of the pipe and continue vertically to the surface.

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2. Do not commence backfilling prior to inspection of the pipe. After inspection, place the sand required above the pipe and proceed with the backfilling operation.
3. Provide sand backfill mechanically compacted in 150-mm (six-inch) lifts to 95 percent of maximum density as determined by ASTM D1557, for all piping inside the building.

M. Natural Gas

1. Do not embed natural gas piping in concrete or conceal it below ground floor slabs within building.

N. Pipes Through Grade Beams

1. Provide pipes and tubing passing through or under building grade beams with a schedule 40 pipe sleeve with 100-mm (4-inch) clearance to prevent possible damage from building settlement.

3.02 ABOVE GROUND PIPING INSTALLATION

A. General

1. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
2. Install pipe and pipe fittings in accordance with recognized industry practices to
3. achieve permanently leakproof systems, capable of performing the indicated service without failure.
4. Install each piping run with a minimum number of joints and couplings but with adequate and accessible unions/flanges for disassembly and maintenance/replacement of valves and equipment.
5. Install piping with sufficient clearance from other piping, building structure and other systems to allow for the piping insulation to be properly applied.
6. Run piping above ground parallel with the lines of the building unless otherwise shown or noted.
7. Keep horizontal runs of piping as high as possible to provide maximum head room.
8. Install piping in equipment rooms so as not to interfere with aiseways and to allow unhindered egress from any point in the space.
9. Keep vertical lines straight in the partitions or furring or as close to the columns as possible.
10. Run pipe to avoid interference with ducts, wires or apparatus and with approved offsets around columns, beams and other obstructions.

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11. Install piping that penetrates a vapor retarder to respect the vapor retarder integrity by sealing the opening around the pipe with vapor retardant tape.
 12. Install piping with sufficient clearance from building structural members so as not to interfere with the application of steel fireproofing.
 13. Establish piping elevations prior to installation to avoid interferences with other piping and materials and equipment of other trades.
 14. Cutting, burning, or welding of structural steel is not permitted, unless indicated otherwise.
- B. Pitching of Piping
1. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 - a. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.
 - b. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 - c. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
 2. Pitch horizontal water and air lines to low points to provide for complete drainage of the system. Minimum pitch, unless otherwise shown: 20 mm in 10 meters (1 inch in 40 feet). Install drain valves at low points and air vents at high points and at locations where air may pocket on water lines.
 3. Pitch steam piping at a uniform grade of 0.2 percent downward in the direction of steam flow.
 4. Pitch gravity condensate return piping at a uniform grade of 0.4 percent in the direction of condensate flow.
- C. Sleeves
1. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- D. Drains
1. Pipe drains from items such as boilers, water relief valves, tanks, cooling coil drain pans, air vents, environmental rooms evaporator condensate drain pans, and drip-pan elbows, to the nearest floor drain.
- E. Copper Tubing
1. Swaging copper tubing to couple two lengths together instead of using an approved solder type coupling will not be permitted. Incompletely filled solder joints are not acceptable.
 2. Make up horizontal joints on piping NPS 2-1/2 (DN 65) and larger in the vertical position before assembly and erection.
 3. Clean surfaces to be soldered both the inside of the fitting and the outside of the tubing, with steel wool or fine sandpaper until all discoloration is removed and metal is smooth and bright.

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4. In assembling copper tube systems, take care to establish proper grade and alignment in the system before soldering. Installations will not be approved where tube and fittings are subjected to strain in order to obtain grade or alignment.
5. Do not bend copper drainage or vent tubes.
6. File or ream cut tube ends to the full original bore.
7. Nipples or sections of heavier wall tube in a DWV (drain, waste, vent) are not permitted.
8. Provide a dirt leg at the bottom of all natural gas piping drops.
9. Do not install type DWV (drain, waste, vent) tube lower than 150 mm (6 inches) above ground.
10. The inter-membering of copper and brass with ferrous metal is not permitted.
11. Make the transition between ferrous and nonferrous metal at an exposed and readily accessible location in a water service or at a water heater. Use insulating couplings at these points.
12. When copper drainage tube is caulked into a hub, first solder to the tube an approved type cast brass adapter or ferrule, long enough to extend through the lead. No lead caulked joint is permitted where the lead is caulked directly against the copper tube.
13. Do not use soft annealed copper tube as drainage or vent piping.

3.03 PIPE JOINTING

A. Mechanical Joint Cast Iron Pipe

1. Assemble mechanical joint cast iron pipe with a gasket suitable for the service, according to the manufacturer's recommendations.

B. Cast Iron Hub-less Pipe

1. Make joints by using a neoprene gasket and stainless steel sleeve using a torque wrench pre-set at 6.8 newton meters (60 inch pounds) on standard couplings and 9.1 newton meters (80 inch pounds) on heavy duty couplings to ensure consistently made joints.

C. Steel Pipe

1. Provide steel pipe NPS 2 (DN 50) and smaller with plain ends and socket weld joints or threaded ends and screwed joints. Provide sizes NPS 2-1/2 (DN 65) and over flanged or grooved with gaskets or welded. Welding of galvanized pipe is not permitted. Connect galvanized pipe with screwed fittings, companion flanges or approved mechanical couplings.
2. Ream pipe ends and take care to prevent foreign material from entering any pipe.
3. Make screwed joints with oil and graphite or other approved compound. Apply joint compound to male thread only and take care to prevent compound from reaching interior of pipe.
4. Install unions or companion flanges in the pipe lines at locations as required to permit the removal of fixtures, apparatus and equipment without dismantling. Do

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not install unions and companion flanges in walls, partitions or other inaccessible locations.

5. "PRESSFIT" joint connections

- a. Square cut and properly de-burr pipe ends. Mark pipe ends to indicate proper insertion length and insert into the coupling/fitting to the internal pipe stop so that pipe is fully engaged.
- b. Employ an electro-hydraulic crimping tool, fitted with interchangeable jaws designed to provide consistent, reliable crimps.

D. Copper Pipe

1. Solder joint connections

- a. Use ASTM B813, water flushable, lead-free flux; ASTM B32, lead-free solder; and ASTM B828 procedure, unless otherwise indicated.
- b. Use a multiple-flame circular torch for soldering tubing NPS 2-1/2 (DN 65) and larger.
- c. For joints in potable water systems, use flux and solder which complies with NSF 61.

2. Mechanical joint press fit joint connections

- a. Square cut and properly de-burr pipe ends and insert into the coupling/fitting to the internal pipe stop so that pipe is fully engaged.
- b. Employ an electro-hydraulic crimping tool, provided by the manufacturer, fitted with interchangeable jaws designed to provide consistent, reliable crimps.

E. "T-Drill" Tube Branching System

1. Copper tee fittings may be made by means of the "T-Drill" tube branching system, providing:
 - a. The size and wall thickness of both the run tube and the branch tube are listed by the manufacturer of forming equipment as "Acceptable Application".
 - b. The mechanically extracted collars are formed by means of a continuous operation consisting of drilling a hole and drawing out the tube surface to form a collar having a height of not less than three times the thickness of the branch tube wall so as to comply with the American Welding Society lap joint weld. Employ a collaring device that is completely adjustable to ensure proper tolerance and complete uniformity of the joint.
 - c. The end of branch tube is notched to conform to the inner curve of the run tube and dimpled to set the exact penetration depth into the collar.
2. Braze all joints in accordance with the CDA Copper Tube Handbook, using BCuP series filler metal. Soft soldered collar joints are not permitted.

F. "T-Drill" Tube Coupling System

1. Copper couplings may be made by means of mechanically formed couplings, providing:

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- a. The couplings are formed by first annealing the area at the end of the tube where the expansion is to occur, inserting the tube expander to the die size required and expanding the tube to accept tubing of the same size.
- b. The resulting joint is a minimum of three times as long as the thickness of the tube and is brazed using BCuP series filler metal.

G. Pipe Welding

1. Perform steel pipe welding by either oxy-acetylene or electric arc method and perform by approved welders qualified in accordance the standard of the Architect. Use welding procedures and provide joint quality which strictly conforms to above procedures. The Architect reserves the right to require qualifying demonstrations, at the Contractor's expense, of any welders assigned to the job.
2. Make tee connections in welded piping with a factory fabricated butt-welding tee or with weld-o-let of butt, socket, or threaded type. When weld-o-lets are used provide a branch connection which is one-half the diameter of the main or less. Scarf welding or direct butt welding of side connections will not be permitted. Tees fabricated from pipe will not be permitted.
3. Use long radius welding ells wherever possible, in changing pipe directions of welded pipelines. Mitered joints are not acceptable.

H. Metallic Pipe Threads

1. Provide screwed pipe and fitting threads that comply with ASME B1.20.1. Discard pipe with threads that are stripped, chipped, corroded or otherwise damaged.
2. Do not use any pipe on which a weld has opened up during the operation of cutting or threading.
3. Field thread metallic pipe in accordance with the following table:

Iron Pipe Size NPS (DN)	Approx. Length of Threaded Portion		Approx. No. of Threads to be Cut
	mm	(in.)	
½ (15)	18.75	¾	10
¾ (20)	18.75	¾	10
1 (25)	21.88	7/8	10
1-1/4 (32)	25	1	11
1-1/2 (40)	25	1	11
2 (50)	25	1	11

4. Use only those thread compounds that are compatible with the liquid or gas being carried in the pipe and that are resistant to the action of the liquid or gas or to any other chemical constituents of the carried liquid or gas.

I. Misalignment Couplings

1. Provide misalignment couplings in the suction and discharge piping of end and double suction pumps. Misalignment couplings shall be "dresser" couplings consisting of a four-diameter length of pipe between connections.

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J. Flanges

1. Provide flanges with 1.6-mm (1/16-inch) raised and drilled face, of the weld-neck type. Slip-on type flanges will not be allowed.
2. Where flanges with raised faces are joined to companion flanges with a flat face, machine the raised face down to a smooth matching surface and use full face gasket.
3. Provide gaskets suitable for the liquid or gas service intended. Gaskets containing asbestos material will not be permitted.

K. Reducing Fittings

1. For proper drainage and air elimination, provide eccentric type fittings when decrease in pipe size is necessary. Bushings will not be permitted.
2. For water and other liquid lines, install the top of pipe on a continuous straight line.
3. For steam, gas, gravity condensate, and air lines, install the bottom of the pipe on a continuous straight line.

3.04 CLEANING AND ADJUSTING

- A. Upon completion of installation, remove manufacturer's temporary labels, marks of identification.
- B. Thoroughly wash surfaces, remove foreign materials, polish surfaces.
- C. Leave entire accessories in neat, orderly, clean, acceptable condition as approved.
- D. Replace any damaged parts and surfaces which are not free from imperfections.

3.05 PROTECTION

- A. Protect Work and materials of this Section prior to and during installation and protect the installed Work and materials of other trades.
- B. In the event of damage, make repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.
- C. Exposed finish shall be free from scratches, dents, permanent discolorations and other defects in workmanship or material.

END OF SECTION

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SECTION 22 11 16 – DOMESTIC WATER SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the building domestic water system for this project

1.02 REFERENCES AND STANDARDS

- A. California Plumbing Code (CPC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Green Building Standards Code (CAL Green), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. American Society of Mechanical Engineers (ASME)
 - 1. A112.18.1M - Plumbing Fixture Fittings
 - 2. B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
 - 3. B16.5 - Pipe Flanges and Flanged Fittings.
 - 4. B16.10 – Face-to-Face and End-to-End Dimensions of Valves.
 - 5. B16.11 - Forged Steel Fittings, Socket-Welding and Threaded.
 - 6. B16.34 – Valves – Flanged, Threaded and Welding End
 - 7. B31.9 - Building Services Piping Code.
- D. American Society of Sanitary Engineering (ASSE)
 - 1. 1016 - Individual Thermostatic, Pressure Balancing, and Combination Pressure Balancing and Thermostatic Control Valves for Individual Fixtures.
 - 2. 1018 - Trap Seal Primer Valves - Water Supply Fed.
- E. American Society for Testing and Materials (ASTM)
 - 1. A105/A105M - Specification for Forgings, Carbon Steel, for Piping Components.
 - 2. B584 - Specification for Copper Alloy Sand Castings for General Applications.
 - 3. D1784 - Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
- F. Institute of Electrical and Electronics Engineers, Inc. (IEEE) 515.1 - Recommended Practice for the Testing, Design, Installation and Maintenance of Electrical Resistance Heat Tracing for Commercial Applications.
- G. Federal Specification (Fed Spec)
 - 1. O-C-114B – Calcium Hypochlorite, Technical.
 - 2. BB-C-120C – Chlorine, Technical, Liquid.

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H. National Sanitation Foundation (NSF) 61 – Drinking Water Components – Health Effects.

I. Plumbing and Drainage Institute (PDI) PDI-WH 201 - Water Hammer Arresters.

1.03 SUBMITTALS

A. Shop Drawings: Submit showing parts, connections and anchorages, adjacent materials, fully dimensioned and noted.

B. Product Data: Submit list of each required accessory and complete descriptive data of products proposed for use. Include manufacturer's specifications, published warranty, installation instructions, and maintenance instructions.

1.04 CLOSEOUT SUBMITTALS

A. Warranty/Guarantee: Submit executed warranty and Subcontractor's guarantee.

B. Keys for lockable accessories.

C. Maintenance data and operating instructions.

1.05 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.

B. Use materials and products of one manufacturer whenever possible.

C. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Project Inspector. Work not so inspected is subject to uncovering and replacement.

D. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver undamaged products to job in manufacturer's sealed containers and/or original bundles with tags and labels intact.

B. Store materials in protected, dry conditions off of ground and in areas so as to not interfere with the progress of the Work.

C. Transport, store and handle in strict accord with the manufacturer's written recommendations.

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1.07 FIELD CONDITIONS

- A. Make and be responsible for field dimensions necessary for proper fitting and completion of Work. Report discrepancies to Engineer before proceeding.
- B. Verify field conditions are adequate for each item prior to ordering. Notify Engineer of conflicts or discrepancies.

PART 2 - PRODUCTS

2.01 SEE SCHEDULES IN PLUMBING DRAWINGS

PART 3 - EXECUTION

3.01 PIPE AND PIPE FITTINGS

- A. Prior to installation of the Work of this Section, carefully inspect and verify that the installed Work of other trades is complete to the point where this installation may properly commence.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. In the event of discrepancy, immediately notify the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.
- D. Refer to Section 22 1100

3.02 VALVES

- A. Provide isolation valves in piping services where branch lines connect to mains and risers.
- B. Provide isolation valves where service is fully open or closed.
- C. Provide throttling valves where pressure regulation or modulating flow are required.
- D. Provide throttling valves to serve as drain valves at low points and at piping dead ends.
- E. Provide only ball valves on strainer blow down service.
- F. Provide plugs or caps on all drain, vent or other open-ended lines and valves.
- G. Provide NPS $\frac{3}{4}$ DN 20 drain valves on piping up through NPS 4 DN 100 and NPS 1-1/2 DN 40 drain valves on piping NPS 5 DN 125 and larger.

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- H. Provide valves NPS 2-1/2 (DN 65) and larger with a drain valve on upper side of valve.
- I. Provide isolation valves and unions at the individual connections to equipment, PRV stations and piping elements to permit complete servicing or removal of piping elements and items of equipment.
- J. When connecting copper tubing to valves, install adapters as follows:
 - 1. Cast copper solder male adapter or union to screwed valves.
 - 2. Copper solder joint companion flange unit.

3.03 TRAP PRIMERS

- A. Install valves in the upright, vertical position only; connect inlet line from the top of the cold water line serving the valve; install the valve a minimum of 125 mm (5 inches) above the floor drain grid, or the flood rim of the sink or fixture which the trap serves.
- B. Install trap primer valves with outlet piping pitched down toward drain trap a minimum of one percent and connect to floor drain body, trap or inlet fitting. Adjust valve for proper flow.
- C. Provide trap primer valves fabricated of solid brass with 1.25-mm (1/2-inch) threaded inlet and outlet connections, inlet sediment screen, outlet vacuum breaker and capable of operating with a minimum pressure drop of 7 kPa (10 psi) at a pressure range from 210 to 525 kPa (30 to 75 psi). Provide primer valves that conform to the material and performance requirements of ASSE 1018.

3.04 WATER HAMMER ARRESTORS

- A. Provide water hammer arresters where quick-closing valves are utilized, unless otherwise approved by the authority having jurisdiction. Locate water hammer arresters within an effective range of quick-closing valves. Provide access to the water hammer arresters.
- B. Locate and install water hammer arresters to comply with Plumbing and Drainage Institute Standard PDI-WH 201.
- C. Provide water hammer arresters of the piston type consisting of a type L copper tubing chamber with a permanent compressed air charge above a two-O-ring piston and a male iron pipe thread connection. Locate the arresters where required to eliminate water hammer in the domestic water systems. Size the arresters in accordance with Plumbing and Drainage Institute Standard PDI-WH 201 and submit selection criteria with Shop Drawings. Install arresters per manufacturer's instructions.

3.05 FIELD QUALITY CONTROL

- A. Inspect domestic water piping as follows:

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1. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
 2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections, and arrange for reinspection.
 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- B. Test domestic water piping as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced domestic water piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 3. Cap and subject piping to static water pressure of 345 kPa (50 psig) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 4. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
 5. Prepare reports for tests and required corrective action.
- C. Domestic water system sterilization
1. Scope: Sterilize each unit of completed domestic water supply line and distribution system with chlorine before acceptance for operation.
 2. See spec section 33 00 00 – SITE UTILITIES for complete methodology and procedure.
- D. In the event of damage, make repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.
- E. Exposed finish shall be free from scratches, dents, permanent discolorations and other defects in workmanship or material.

END OF SECTION

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SECTION 22 13 16 – SANITARY WASTE AND VENT SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the building sanitary waste and vent system for this project

1.02 REFERENCES AND STANDARDS

- A. California Plumbing Code (CPC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).

1.03 SUBMITTALS

- A. Shop Drawings: Submit showing parts, connections and anchorages, adjacent materials, fully dimensioned and noted.
- B. Product Data: Submit list of each required accessory and complete descriptive data of products proposed for use. Include manufacturer's specifications, published warranty, installation instructions, and maintenance instructions.

1.04 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. Use materials and products of one manufacturer whenever possible.
- C. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Project Inspector. Work not so inspected is subject to uncovering and replacement.
- D. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing- in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- E. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

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- F. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- G. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg (250 Pa). Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.
- H. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 2. Cap and subject piping to static-water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 4. Prepare reports for tests and required corrective action.

1.05 FIELD CONDITIONS

- A. Make and be responsible for field dimensions necessary for proper fitting and completion of Work. Report discrepancies to Engineer before proceeding.

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- B. Verify field conditions are adequate for each item prior to ordering. Notify Engineer of conflicts or discrepancies.

PART 2 - PRODUCTS

2.01 SEE SCHEDULES IN PLUMBING DRAWINGS

PART 3 - EXECUTION

3.01 PIPE AND PIPE FITTINGS

- A. Prior to installation of the Work of this Section, carefully inspect and verify that the installed Work of other trades is complete to the point where this installation may properly commence.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. In the event of discrepancy, immediately notify the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.
- D. Refer to Section 22 11 00

3.02 VENT TERMINALS ABOVE ROOFS

- A. Terminate extensions of plumbing vent pipes through the roofs at least 450 mm (18 inches) above roof line. Where a roof is to be used for any purpose other than weather protection, run the vent extensions at least 2.1 meters (seven feet) above the roof line, and rigidly support. Locate the vent terminal in relation to surrounding areas, to conform to the provisions of the local plumbing code.
- B. Minimum size of vent terminal pipes through roof: NPS 4 (DN 100).
- C. Vent flashing and counterflashing as specified in Thermal and Moisture Protection Division

3.03 CLEANOUTS

- A. Provide cleanouts as shown, specified, and at such other locations as required by the plumbing code.
- B. Provide a cleanout at the base of each vertical soil and waste stack.
- C. Provide cleanouts the same size as the pipe with a maximum size of NPS 4 (DN 100). Extend cleanouts below floors up to floor level with bends and extensions as necessary

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so the cleanout plug is accessible and not covered with any permanent finishing material.

- D. Provide cleanouts on horizontal soil, waste and drainage lines at their ends, at any change in direction of greater than 45 degrees, and at other points so that the distance between cleanouts does not exceed 15 meters (50 feet) in lines of NPS 4 (DN 100) pipes or less and 30 meters (100 feet) for larger pipes.
- E. Install floor cleanouts flush with floor surface.
- F. Provide heavy duty floor drains and cleanouts wherever vehicular traffic of any kind is possible.

3.04 FLOOR DRAINS AND TRENCH DRAINS

- A. Position floor drains for easy access and maintenance.
- B. Install floor-drain wide flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
- C. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- D. Install individual catch basins for each trench drain, unless otherwise indicated. Trench drains shall drain to sewage holding tanks on premises.
- E. Provide 450-mm- (18-inch-) diameter sheeting around floor drains and cleanouts in supported slabs. Secure sheeting into the floor drain or cleanout body by means of the clamping collar. Install sheeting approximately 13 mm (1/2 inch) above the top of the metal deck to allow the concrete to flow under the sheeting into the deck voids.
- F. Provide corrosion resistant stainless steel trench drain covers

3.05 PROTECTION

- A. Protect Work and materials of this Section prior to and during installation and protect the installed Work and materials of other trades.
- B. In the event of damage, make repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.
- C. Exposed finish shall be free from scratches, dents, permanent discolorations and other defects in workmanship or material.

END OF SECTION

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SECTION 23 01 00 – BASIC MECHANICAL

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the basic requirements for the mechanical work on this project
- B. Work Included
 - 1. Furnish and install a fully functional HVAC systems including all equipment, ductwork, controls and other material as shown on in the Mechanical Drawings and specified herein. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that any accessories, control modules, control interfaces, programming or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
 - 2. Site and System Investigation: The bidding contractor for the HVAC system shall visit the site prior to the bid and become thoroughly knowledgeable about how to integrate the new HVAC system with any existing Energy Management Systems or District Standard controls. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.

1.02 REFERENCES AND STANDARDS

- A. California Mechanical Code (CMC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA)
- B. California Energy Code (CENC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA)
- C. California Green Building Code (CGC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA)
- D. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
- E. Occupational Safety and Health Administration (OSHA)

1.03 SUBMITTALS

- A. Product Data
- B. Operation and Maintenance (O&M) Manuals
 - 1. Submit operation and maintenance manuals for each mechanical system, except as otherwise specified herein, and for each piece of equipment.

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2. Submit 1 draft copy of each manual at least 15 days before requesting inspection for Substantial completion. Include a complete operation and maintenance directory. Architect will return the copy indicating whether scope and general content of manuals are acceptable.
 3. Include the names, addresses, and telephone numbers of each subcontractor installing equipment and systems and of the local representatives for each item of equipment and each system. Provide a table of contents, assemble the manual to conform to the table of contents with the tab sheets placed before instructions covering the subject. The instruction sheets shall be legible and easy to read, with large sheets of drawings folded in.
 - a. Include the following in the manual:
 - b. A system description and layout showing piping, valves, and controls.
 - c. Wiring and control diagrams with data to explain detailed operation and control of each component.
 - d. A control sequence describing start-up, operation and shut-down.
 - e. A detailed description of the function of each principal component of the system.
 - f. The procedure for starting.
 - g. The procedure for operation.
 - h. Shut-down instructions.
 - i. Installation instructions.
 - j. Maintenance and overhaul instructions.
 - k. Lubrication schedule including type, grade, temperature range, and frequency.
 - l. List of size, location and number of filters.
 - m. Safety precautions, diagrams, and illustrations.
 - n. Test procedures.
 - o. Performance data.
 - p. Parts lists.
 4. In the parts lists for equipment, indicate the sources of supply, recommended spare parts, and the service organization which is reasonably convenient to the building site.
 5. Provide the manual complete in all respects for all equipment, controls, accessories, and associated appurtenances provided.
- C. Field Test Reports (including Energy Code Acceptance Tests)
- D. Posted Operating Instructions
1. Furnish operating instructions for each system and each principal piece of equipment for the use of operation and maintenance personnel, including wiring and control diagrams showing the complete layout of the entire system including equipment, piping, valves, and control sequence, framed under glass or in approved laminated plastic and posted where directed.
 2. Provide printed or engraved operating instructions for each principal piece of equipment, attached or posted adjacent to the piece of equipment, including start-up, proper adjustment, operating, lubrication, shut-down safety precautions,

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procedure in the event of equipment failure and any other necessary items of instruction as recommended by the manufacturer of the unit.

3. For operating instructions exposed to the weather, use weather-resisting materials or enclose suitably so as to be weather protected. Provide operating instructions which do not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.04 QUALITY ASSURANCE

- A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred as authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.
- C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:
 1. California Electrical Code (CEC)
 2. California Building Code (CBC)
 3. California Green Building Code (CGC)
 4. California Fire Code (CFC)
 5. California Energy Code (CENC)
 6. California Mechanical Code (CMC)
 7. California Plumbing Code (CPC)
- D. Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:
 1. ACIAmerican Concrete Institute
 2. ANSI American National Standards Institute
 3. ASTM American Society for Testing Materials
 4. FS Federal Specification
 5. UL Underwriters' Laboratories
- E. Sequencing and Scheduling:
 1. Coordinate mechanical equipment installation with other building components.
 2. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
 3. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

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4. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.
 5. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
 6. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.
- F. Testing, Adjusting, and Balancing technician certification, refer to Section 23 05 93
- G. All base material shall be ASTM, ANSI, and/or SMACNA standards.
- H. All mechanical equipment furnished under this Section shall bear the UL label where such label is applicable.
- I. Certify that each welder performing Work has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

PART 2 - PRODUCTS

- A. SEE SCHEDULES IN MECHANICAL DRAWINGS

PART 3 - EXECUTION

3.01 ROUGH-IN

- A. Contractor shall verify lines, levels and dimensions indicated on the construction document drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.
- B. Verify final locations for rough-ins with field measurements and with the requirements for the actual equipment to be connected.
- C. Refer to equipment specifications in other sections for equipment rough-in requirements.

3.02 PROTECTION

- A. Piping Systems
1. Provide only new pipe, equipment and appurtenances and maintain clean and free from rust, dirt, scale, and other contaminants. Provide temporary air-tight covers at pipe openings at all equipment.

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2. Do not leave piping open. At the end of each work day cap over ends of piping wherever they occur until such time as piping extensions or final connections are made to equipment, fixtures, etc.
3. Before starting up piping systems, provide temporary 20 mesh screens in each strainer. Remove temporary screens and replace them with permanent screens only after dirt and scale has been removed from the piping system.

B. Air Handling Systems

1. Continuously maintain adequate protection to keep dirt and foreign matter from getting into the air handling system.
2. Per CGC requirements, do not leave ductwork open. At the end of each work day seal open sections of duct and open fittings wherever they occur until such time as duct extensions or final connections are made to equipment, terminal units, grilles, registers and diffusers.

3.03 IDENTIFICATION

- A. Nameplates: For each component of equipment, provide the manufacturer's name, catalog number and date of manufacture on a plate securely attached to the item of equipment, or the name and catalog number and date of manufacture may be stamped or cast into the body of the item. Also include data pertinent to the operation and characteristics of the equipment.

3.04 INSTALLATION

- A. Preparation, sequencing, handling, and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified.
- B. Comply with Manufacturer Shop Drawings.
- C. Verify all dimensions by field measurements.
- D. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
- E. In general, most main offsets and transitions of piping and duct work are shown on the drawings in order to indicate approximate locations in plan and elevation where the systems are intended to be run.
- F. The Contract Documents are not intended to serve as coordinated construction drawings showing all minor adjustments in locations and duct cross sections that are required for a fully coordinated installation that respects the work of all trades.
- G. Fully coordinate the mechanical work within itself and with the work of other trades to ensure the avoidance of all interferences.

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- H. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
- I. Sequence, coordinate and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- J. Where mounting height is not detailed or dimensioned, contact the Architect for direction prior to proceeding with rough-in.
- K. Mechanical equipment and devices have been shown on the Drawings in the approximate location required for reasons of access, noise control or maintainability. Minor adjustments in location dictated by coordination with other work are permitted. Major relocations for reasons other than these are not to be made without specific written approval.
- L. Before proceeding with the installation of piping and ductwork, inspect the Contract Documents and determine that the location of the Work does not interfere with other work. In case of interference request clarification from the Architect in writing.
- M. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the construction documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
- N. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
- O. Install mechanical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- P. Coordinate mechanical systems, equipment, and materials installations with other building components.
- Q. Provide access panel or doors where devices or equipment are concealed behind finished surfaces.
- R. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.

3.05 CUTTING, PATCHING, PAINTING, AND SEALING

- A. Structural members shall in no case be drilled, bored, or notched in such a manner that will compromise their structural integrity. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.

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- B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- C. Application of joint sealers:
 - 1. General: Comply with joint sealer Manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.
 - 2. Installation of fire-stopping sealant: Install sealant, including forming, packing and other accessory materials, to fill openings around mechanical ducts or pipes penetrating floors and walls, to provide fire-stops and fire-resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

3.06 FIELD QUALITY CONTROL

- A. General testing requirements:
 - 1. The purpose of testing is to ensure that all tested mechanical equipment, both Contractor and Owner supplied, is operational and within industry and Manufacturer's tolerances and is installed in accordance with design Specifications.
 - 2. Tests and inspections shall determine suitability for startup.
 - 3. Perform tests in presence of the Owner's Representative and furnish test equipment, facilities and technical personnel required to perform tests.
 - 4. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications.
- B. Tests: In addition to specific system test described elsewhere, tests shall include:
 - 1. Activation of the permanent heating, ventilating, and air conditioning systems for testing and balancing will be allowed only after the building is substantially complete, or by written request to and written permission of the Architect.
 - 2. Thoroughly flush and clean all supply and return piping, strainers etc., before the heating and air conditioning systems are activated. Clean all strainers at least once each week for the first month of system operation and then once each month thereafter until Owner's final acceptance of the work. Re-check systems for compliance with the Contract Documents to establish that they are free of all defects resulting from early activation of the permanent heating, ventilating and air conditioning systems. Before final acceptance of the work by the Owner, again flush, clean and adjust the systems and replace all strainer baskets.
 - 3. Install a set of the specified primary filters as temporary filters to prevent the accumulation of dust and dirt in all the duct systems before the heating, ventilating and air conditioning duct systems are activated. If the temporary filters become loaded to capacity during system activation, replace the filters. Install replacement filters upon completion of the Work and prior to acceptance of the Work by the Owner.

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4. Thoroughly clean all ductwork after early activation of the permanent heating, ventilating and air conditioning systems and before being turned over to the Owner. Clean either by vacuum cleaning or blowing out with a pressure blower.
 5. Properly operate, and maintain the permanent heating, ventilating and air conditioning systems to the time of final acceptance by the Owner. Maintain the minimum temperatures called for under Temporary Heating during this period. Make any adjustments and repairs required to comply with the Specifications, tests, and balancing of the permanent systems to the satisfaction of the Architect before final acceptance of the system by the Owner and Architect. Make all repairs and adjustments required to put the heating, ventilating and air conditioning systems and equipment into first class condition before final acceptance by the Architect and Owner.
 6. Advise the Owner when the above has been done and the systems are ready for final balancing. Refer to Section 230593, for procedures.
- C. Contractor shall provide test power required when testing equipment before electrical service energization.
- D. Testing safety and precautions:
1. Safety practices shall include the following requirements:
 - a. Applicable State and Local safety operating procedures.
 - b. OSHA
 - c. NSC
- E. Calibration of test equipment:
1. Testing Agency shall have calibration program that assures test instruments are maintained within rated accuracy.
 2. Instruments shall be calibrated in accordance with the following frequency schedule:
 - a. Field instruments: Analog, 6 month maximum; Digital, 12 months maximum.
 - b. Laboratory instruments: 12 months.
 - c. Leased specialty equipment: 12 months where accuracy is guaranteed by lessor.
 3. Dated calibration labels shall be visible on test equipment.
 4. Records, which show date and results of instruments calibrated or tested, must be kept up-to-date.
 5. Up-to-date instrument calibration instructions and procedures shall be maintained for test instrument.
 6. Calibration standards shall be of higher accuracy than instrument tested.
 7. Equipment used for field testing shall be more accurate than instrument being tested.
- F. Coordinate with General Contractor regarding testing schedule and availability of equipment ready for testing.

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- G. Notify Owner one week in advance of any testing.
- H. Any products which fail during the tests or are ruled unsatisfactory by the Owner's Representative shall be replaced, repaired, or corrected as prescribed by the Owner's Representative at the expense of the Contractor. Tests shall be performed after repairs, replacements or corrections until satisfactory performance is demonstrated.
- I. Testing Agency shall maintain written record of tests and shall assemble and certify final test report. All test results/reports shall be submitted to the Mechanical Engineer for review.
- J. Include all test results in the maintenance manuals.

3.07 CLEANING

- A. Prior to starting up mechanical equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.
- B. Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all mechanical equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.
- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.
- D. Refer to Section 23 31 00 for duct cleaning

3.08 ENERGY CODE COMPLIANCE

- A. NRCC: Per Title 24, Part 6 California Energy Code (CENC) the Non-Residential Certificates of Compliance (NRCC) shall be included in the Contract Documents. The NRCC outlines the specific requirements for how the project meets or exceeds CENC. Including what equipment, fixtures, and controls must be installed and how they are installed. The Contractor shall review the NRCC forms and coordinate all requirements with the applicable parties.
- B. NRCI: Upon installation of the applicable equipment, fixtures, and controls, the Contractor shall provide and complete the required Non-Residential Certificates of Installation (NRCI) as listed in the NRCC forms. The NRCI form verifies that what was installed matches what was specified in the NRCC.
- C. Acceptance Tests (NRCA): After initial start-up of the applicable equipment, fixtures, and controls, the Contractor shall conduct Acceptance Testing per CENC requirements. The Contractor shall be responsible for all testing and ensure the testing is documented in the applicable Non-Residential Certificate of Acceptance (NRCA)

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forms. The HVAC Acceptance Testing shall be conducted by a technician that is certified with one of the California Energy Commission's approved Acceptance Test Technician Certification Providers (ATTCP).

- D. Upon completion of the project, the Contractor shall provide all energy compliance forms to the Owner.

END OF SECTION

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SECTION 23 05 93 – TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the basic requirements for the Testing, Adjusting, and Balancing (TAB) of the HVAC systems on this project

1.02 REFERENCES AND STANDARDS

- A. California Mechanical Code (CMC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Energy Code (CENC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. California Green Building Code (CGC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- D. Air Movement and Control Association (AMCA)
- E. Associated Air Balance Council (AABC)
- F. National Environmental Balancing Bureau (NEBB)
- G. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
 - 1. HVAC Systems – Duct Design.
 - 2. HVAC Systems – Testing, Adjusting, and Balancing.
- H. Occupational Safety and Health Administration (OSHA)

1.03 SUBMITTALS

- A. Quality-Assurance Submittals: Within 30 days from the Contractor's Notice to Proceed, submit 2 copies of evidence that the testing, adjusting, and balancing Agent and this Project's testing, adjusting, and balancing team members meet the qualifications specified in the "Quality Assurance" Article below.
- B. Contract Documents Examination Report: Within 45 days from the Contractor's Notice to Proceed, submit 2 copies of the Contract Documents review report as specified in Part 3 of this Section.

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- C. Strategies and Procedures Plan: Within 60 days from the Contractor's Notice to Proceed, submit 2 copies of the testing, adjusting, and balancing strategies and step-by-step procedures as specified in Part 3 "Preparation" Article below. Include a complete set of report forms intended for use on this Project.
- D. Certified Testing, Adjusting, and Balancing Reports: Submit 2 copies of reports prepared, as specified in this Section, on approved forms certified by the testing, adjusting, and balancing Agent.
- E. Warranty: Submit 2 copies of special warranty specified in the "Warranty" Article below.

1.04 QUALITY ASSURANCE

- A. Agent Qualifications: Engage a testing, adjusting, and balancing agent certified by AABC or NEBB.
- B. Testing, Adjusting, and Balancing Conference: Meet with the Owner's and the Architect's representatives on approval of the testing, adjusting, and balancing strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of testing, adjusting, and balancing team members, equipment manufacturers' authorized service representatives, HVAC controls Installer, and other support personnel. Provide 7 days' advance notice of scheduled meeting time and location. Agenda Items include at least the following:
 - 1. Submittal distribution requirements.
 - 2. Contract Documents examination report.
 - 3. Testing, adjusting, and balancing plan.
 - 4. Work schedule and Project site access requirements.
 - 5. Coordination and cooperation of trades and subcontractors.
 - 6. Coordination of documentation and communication flow.
- C. Certification of Testing, Adjusting, and Balancing Reports: Certify the testing, adjusting, and balancing field data reports. This certification includes the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports.
 - 2. Certify that the testing, adjusting, and balancing team complied with the approved testing, adjusting, and balancing plan and the procedures specified and referenced in this Specification.
- D. Testing, Adjusting, and Balancing Reports: Use standard forms from AABC's "National Standards for Testing, Adjusting, and Balancing." Or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
- E. Instrumentation Type, Quantity, and Accuracy: As described in AABC national standards. Or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."

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F. Performance Requirements

1. Adjusting and balancing shall be performed in accordance with the latest edition of the AABC National Standards, NEBB Procedural Standards, and in accordance with the scope of Work specified in the Contract Documents.
2. Adjusting and balancing shall not begin until systems are complete, temporary filters and strainers are removed and permanent filters installed, piping systems are cleaned, flushed and chemically treated, all as properly scheduled and approved in advance by the Architect.
3. In addition to demonstrating that the systems are capable of achieving design load point flows, the adjusting and balancing agency shall demonstrate, and so include in the report forms, that the automatic control systems respond properly to load variations.
4. Upon the completion of the Work, the adjusting and balancing agency shall submit four copies of the complete adjusting and balancing report.
5. One agency shall be responsible for all phases of adjusting and balancing.
6. The adjusting and balancing agency shall permanently mark the settings of all valves, dampers and other adjusting devices in a manner that will allow the settings to be restored. If a balancing device is provided with a memory stop, it shall be set and locked.

1.05 SEQUENCING AND SCHEDULING

- A. The Contractor shall provide the adjusting and balancing agency with one set of the following documents:
1. Within 30 days after approved selection of adjusting and balancing agency:
 - a. Contract Drawings.
 - b. Applicable Specifications.
 - c. Addenda.
 2. As issued:
 - a. Change Orders.
 3. Within 30 days after approval, applicable shop drawings, including the following items:
 - a. Sheet metal fabrication and construction drawings.
 - b. Equipment manufacturer's submittal data.
 - c. Temperature control drawings.
- B. Upon receipt of the above listed documents from the Contractor, the adjusting and balancing agency shall evaluate the air and hydronic systems proposed layouts and determine the adequacy of the type, number and location of balancing devices being provided.
- C. Any deficiency in the balancing device type, number and location shall be noted by the adjusting and balancing agency and the Contractor shall be so notified.

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- D. Fabrication and installation of the air and hydronic systems shall not begin until the Contractor has received this report from the adjusting and balancing agency and has taken corrective action.
- E. The adjusting and balancing agency shall further be provided with the following:
 - 1. Reasonable time to complete the adjusting and balancing prior to the required completion date.
 - 2. Completely operable systems.
 - 3. The right to adjust the systems.
 - 4. Access to system components.
 - 5. Master keys if the building is occupied.
 - 6. Secure storage space for tools and instruments.
- F. The Contractor shall ensure that the adjusting and balancing agency's personnel receive the full cooperation and assistance of the personnel of the pipe fitting, sheet metal and automatic control trades during the adjusting and balancing process.
- G. The Contractor shall be responsible for start-up and operation of systems during the adjusting and balancing process. Start-up shall include the following:
 - 1. All equipment operable in safe and normal condition.
 - 2. Automatic control systems installed complete and operable.
 - 3. Proper thermal overload protection in place for electrical equipment.
 - 4. For air systems:
 - a. Final filters clean and in place.
 - b. Duct systems clean of debris.
 - c. Correct fan rotation.
 - d. Fire and volume dampers in place and open.
 - e. Coil fins combed and cleaned.
 - f. Access doors closed and duct end caps in place.
 - g. All outlets installed and connected.
 - h. Duct system testing completed and leakage not exceeding the rate specified.
 - 5. For hydronic systems:
 - a. Flushed, filled, and vented.
 - b. Correct pump rotation.
 - c. Proper strainer baskets clean and in place.
 - d. Temporary start-up strainer baskets removed.
 - e. Service and balance valves open.
 - f. Piping systems testing completed and accepted.

1.06 WARRANTY

- A. General Warranty: The national project performance guarantee specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

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- B. National Project Performance Guarantee: Provide a guarantee on AABC'S "National Standards" forms stating that AABC will assist in completing the requirements of the Contract Documents if the testing, adjusting, and balancing Agent fails to comply with the Contract Documents. Guarantee includes the following provisions:
1. The certified Agent has tested and balanced systems according to the Contract Documents.
 2. Systems are balanced to optimum performance capabilities within design and installation limits.
- C. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing the requirements of the Contract Documents if the testing, adjusting, and balancing Agent fails to comply with the Contract Documents. Guarantee includes the following provisions:
1. The certified Agent has tested and balanced systems according to the Contract Documents.
 2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS

2.01 ADJUSTING AND BALANCING EQUIPMENT

- A. Instrumentation: Provide air system adjusting and balancing instrumentation such as pitot tubes, flow hoods, incline gauge or U-tube manometers or magnehelic gages, anemometer, tachometer or rpm counter, insertion thermometers, clamp-on ammeter for motor voltage and ampere readings and others to be able to completely analyze and balance air handling systems. Instrumentation shall be accurately calibrated and checked before usage.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting, and balancing of systems and equipment.
1. Contract Documents are defined in the General and Supplementary Conditions of the Contract.
 2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow- control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

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- B. Examine approved submittal data of HVAC systems and equipment.
- C. Examine project record documents described in Division 1 Section "Project Record Documents."
- D. Examine Architect's and Engineer's design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data, including fan and pump curves. Relate performance data to project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce the performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.
- F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Specification Sections have been performed.
- G. Examine system and equipment test reports.
- H. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- I. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- J. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- K. Examine terminal units, such as variable-air-volume boxes and mixing boxes, to verify that they are accessible and their controls are connected and functioning.
- L. Examine plenum ceilings, utilized for supply air, to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.
- M. Examine strainers for clean screens and proper perforations.

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- N. Examine 3-way valves for proper installation for their intended function of diverting or mixing fluid flows.
- O. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- P. Examine open-piping-system pumps to ensure absence of entrained air in the suction piping.
- Q. Examine equipment for installation and for properly operating safety interlocks and controls.
- R. Examine automatic temperature system components to verify the following:
 - 1. Dampers, valves, and other controlled devices operate by the intended controller.
 - 2. Dampers and valves are in the position indicated by the controller.
 - 3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
 - 4. Automatic modulating and shutoff valves, including 2-way valves and 3-way mixing and diverting valves, are properly connected.
 - 5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
 - 6. Sensors are located to sense only the intended conditions.
 - 7. Sequence of operation for control modes is according to the Contract Documents.
 - 8. Controller set points are set at design values. Observe and record system reactions to changes in conditions. Record default set points if different from design values.
 - 9. Interlocked systems are operating.
 - 10. Changeover from heating to cooling mode occurs according to design values.
- S. Report deficiencies discovered before and during performance of testing, adjusting, and balancing procedures.

3.02 PREPARATION

- A. Prepare a testing, adjusting, and balancing plan that includes strategies and step-by-step procedures.
- B. Complete system readiness checks and prepare system readiness reports. Verify the following:
 - 1. Permanent electrical power wiring is complete.
 - 2. Hydronic systems are filled, clean, and free of air.
 - 3. Automatic temperature-control systems are operational.
 - 4. Equipment and duct access doors are securely closed.
 - 5. Balance, smoke, and fire dampers are open.

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6. Filters installed with MERV rating per CGC requirements
7. Isolating and balancing valves are open and control valves are operational.
8. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
9. Windows and doors can be closed so design conditions for system operations can be met.

3.03 GENERAL TESTING AND BALANCING PROCEDURES

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC national standards and this Section.
- B. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.
- C. Perform testing and balancing procedures on each system according to the procedures contained in SMACNA's "HVAC Systems--Testing, Adjusting, and Balancing" and this Section.
- D. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to the insulation Specifications for this Project.
- E. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, valve indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.04 FUNDAMENTAL AIR SYSTEM BALANCING PROCEDURES

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Include in the balance report CFM readings for both supply and return/exhaust fans in both the "Full return" and "Full exhaust" damper positions.
- C. Prepare schematic diagrams of systems' "as-built" duct layouts.
- D. For variable-air-volume systems, develop a plan to simulate diversity.
- E. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

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- F. Check the airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.
- G. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- H. Verify that motor starters are equipped with properly sized thermal protection.
- I. Check dampers for proper position to achieve desired airflow path.
- J. Check for airflow blockages.
- K. Check condensate drains for proper connections and functioning.
- L. Check for proper sealing of air-handling unit components.

3.05 CONSTANT VOLUME AIR SYSTEM BALANCING PROCEDURES

- A. The procedures in this section apply to constant-volume supply-, return-, and exhaust-air systems. Additional procedures are required for variable-air-volume, multizone, dual-duct, induction-unit supply-air systems and process exhaust-air systems. These additional procedures are specified in other articles in this Section.
- B. Adjust fans to deliver total design airflows within the maximum allowable rpm listed by the fan manufacturer.
- C. Measure fan static pressures to determine actual static pressure as follows:
- D. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
- E. Measure static pressure directly at the fan outlet or through the flexible connection.
- F. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
- G. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
- H. Measure static pressure across each air-handling unit component.
- I. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
- J. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers under final balanced conditions.

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- K. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
- L. Adjust fan speed higher or lower than design with the approval of the Architect. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
- M. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan- motor amperage to ensure no overload will occur. Measure amperage in full cooling, full heating, and economizer modes to determine the maximum required brake horsepower.
- N. Adjust volume dampers for main duct, submain ducts, and major branch ducts to design airflows within specified tolerances.
- O. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
- P. Where sufficient space in submains and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
- Q. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submains and branch ducts to design airflows within specified tolerances.
- R. Measure terminal outlets and inlets without making adjustments.
- S. Measure terminal outlets using a direct-reading hood or the outlet manufacturer's written instructions and calculating factors.
- T. Adjust terminal outlets and inlets for each space to design airflows within specified tolerances of design values. Make adjustments using volume dampers rather than extractors and the dampers at the air terminals.
- U. Adjust each outlet in the same room or space to within specified tolerances of design quantities without generating noise levels above the limitations prescribed by the Contract Documents.
- V. Adjust patterns of adjustable outlets for proper distribution without drafts.

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3.06 MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 - 1. Manufacturer, model, and serial numbers.
 - 2. Motor horsepower rating.
 - 3. Motor rpm.
 - 4. Efficiency rating if high-efficiency motor.
 - 5. Nameplate and measured voltage, each phase.
 - 6. Nameplate and measured amperage, each phase.
 - 7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.07 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans: Minus 5 to plus 10 percent.
 - 2. Air Outlets and Inlets:
 - 3. Positive Zones: Supply Air 0 to +10% Exh/Ret Air 0 to -10%
 - 4. Negative Zones: Supply Air 0 to -10% Exh/Ret Air 0 to +10%
 - 5. Note: When spaces are balanced to the above criteria, the differential between air in and air out must be maintained.
 - 6. Heating-Water Flow Rate: 0 to minus 10 percent.
 - 7. Cooling-Water Flow Rate: 0 to minus 5 percent.

3.08 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article above, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

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3.09 FINAL REPORT

- A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in 3-ring binder, tabulated and divided into sections by tested and balanced systems.
- B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
- C. Include a list of the instruments used for procedures, along with proof of calibration.
- D. Final Report Contents: In addition to the certified field report data, include the following:
 - 1. Pump curves.
 - 2. Fan curves.
 - 3. Manufacturers' test data.
 - 4. Field test reports prepared by system and equipment installers.
 - 5. Other information relative to equipment performance, but do not include approved Shop Drawings and Product Data.
- E. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:
 - 1. Title page.
 - 2. Name and address of testing, adjusting, and balancing Agent.
 - 3. Project name.
 - 4. Project location.
 - 5. Architect's name and address.
 - 6. Engineer's name and address.
 - 7. Contractor's name and address.
 - 8. Report date.
 - 9. Signature of testing, adjusting, and balancing Agent who certifies the report.
 - 10. Summary of contents, including the following:
 - a. Design versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 - 11. Nomenclature sheets for each item of equipment.
 - 12. Data for terminal units, including manufacturer, type size, and fittings.
 - 13. Notes to explain why certain final data in the body of reports vary from design values.
 - 14. Test conditions for fans and pump performance forms, including the following:
 - a. Settings for outside-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings, including settings and percentage of maximum pitch diameter.

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- f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
 - F. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present with single-line diagrams and include the following:
 - 1. Quantities of outside, supply, return, and exhaust airflows.
 - 2. Water and steam flow rates.
 - 3. Duct, outlet, and inlet sizes.
 - 4. Pipe and valve sizes and locations.
 - 5. Terminal units.
 - 6. Balancing stations.
 - G. Fan Test Reports: For supply, return, and exhaust fans, include the following:
 - 1. Fan Data: Include the following:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in mm (inches), and bore.
 - h. Sheave dimensions, center-to-center and number of adjustments in mm (inches).
 - 2. Motor Data: Include the following:
 - a. Make and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in mm (inches), and bore.
 - f. Sheave dimensions, center-to-center and number of adjustments in mm (inches).
 - g. Number of belts, make, and size.
 - 3. Test Data: Include design and actual values for the following:
 - a. Total airflow rate in L/s (cfm).
 - b. Total system static pressure in Pa (inches wg).
 - c. Fan rpm.
 - d. Discharge static pressure in Pa (inches wg).
 - e. Suction static pressure in Pa (inches wg).
- 3.10 ADDITIONAL TESTS
- A. Within 90 days of completing testing, adjusting, and balancing, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

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- B. Seasonal Periods: If initial testing, adjusting, and balancing procedures were not performed during near-peak summer and winter conditions, perform additional inspections, testing, and adjusting during near-peak summer and winter conditions.

END OF SECTION

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SECTION 23 31 00 – DUCT SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the HVAC duct system for this project

1.02 REFERENCES AND STANDARDS

- A. California Mechanical Code (CMC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Green Building Code (CGC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. American Conference of Governmental Industrial Hygienists (ACGIH): Industrial Ventilation Manual.
- D. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE): HVAC Applications Handbook.
- E. American Society of Mechanical Engineers (ASME): B1.1 - Unified Inch Screw Threads (UN and UNR Thread Form).
- F. American Society for Testing and Materials (ASTM)
1. A366/A366M - Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.
 2. A463 - Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process.
 3. A480/A480M - Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
 4. A653/A653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
 5. A924/A924M - Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 6. B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 7. B248 - Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip and Rolled Bar.
 8. B248M - Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip and Rolled Bar [Metric].
 9. B370 - Specification for Copper Sheet and Strip for Building Construction.
 10. B601 - Practice for Temper Designations for Copper and Copper Alloys-Wrought and Cast
 11. C177 - Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

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12. C411 - Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 13. C423 - Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 14. C553 - Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 15. C1071 - Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material).
 16. C1104/C1104M - Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 17. D1037 - Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
 18. E84 - Test Method for Surface Burning Characteristics of Building Materials.
 19. E662 - Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 20. G21 - Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
 21. G22 - Practice for Determining Resistance of Plastics to Bacteria.
- G. Federal Specifications (Fed. Spec.)
1. TT-C-1796A - Calking Compounds, Metal Seam and Wood Seam.
 2. TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type (for Buildings and Other Types of Construction)
- H. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS): SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture.
- I. National Air Duct Cleaners Association (NADCA): 1992 – Mechanical Cleaning of Non-Porous Air Conveyance System Components.
- J. National Fire Protection Association (NFPA)
1. 90A - Installation of Air Conditioning and Ventilating Systems.
 2. 90B - Installation of Warm Air Heating and Air Conditioning Systems.
 3. 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.
 4. 255 - Test of Surface Burning Characteristics of Building Materials.
- K. North American Insulation Manufacturers Association (NAIMA): Fibrous Glass Duct Liner Standards - Design, Fabrication and Installation Guidelines, First Edition 1994.
- L. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
1. HVAC Duct Construction Standards - Metal and Flexible. (Third Edition - 2005) Fourth Printing 2009.
 2. HVAC Duct Leakage Test Manual.
 3. Ducted Electric Heat Guide for Air Handling Systems.
 4. Round Industrial Duct Construction Standards.
 5. Rectangular Industrial Duct Construction Standards.

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6. Accepted Industry Practice for Industrial Duct Construction.

M. Underwriters Laboratories Inc. (UL)

1. 181 - Factory-Made Air Ducts and Connectors.
2. 723 - Test for Surface Burning Characteristics of Building Materials.

1.03 SUBMITTALS

- A. Shop Drawings: Submit showing parts, connections and anchorages, adjacent materials, fully dimensioned and noted.
- B. Product Data: Submit list of each required accessory and complete descriptive data of products proposed for use. Include manufacturer's specifications, published warranty, installation instructions, and maintenance instructions.

1.04 CLOSEOUT SUBMITTALS

- A. Warranty/Guarantee: Submit executed warranty and Subcontractor's guarantee.
- B. Maintenance data and operating instructions.

1.05 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. Use materials and products of one manufacturer whenever possible.
- C. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Project Inspector. Work not so inspected is subject to uncovering and replacement.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver undamaged products to job in manufacturer's sealed containers and/or original bundles with tags and labels intact.
- B. Store materials in protected, dry conditions off of ground and in areas so as to not interfere with the progress of the Work.
- C. Transport, store and handle in strict accord with the manufacturer's written recommendations.

1.07 FIELD CONDITIONS

- A. Make and be responsible for field dimensions necessary for proper fitting and completion of Work. Report discrepancies to Engineer before proceeding.

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- B. Verify field conditions are adequate for each item prior to ordering. Notify Engineer of conflicts or discrepancies.

PART 2 - PRODUCTS

2.01 MATERIAL FOR DUCT AND RELATED SHEET METAL WORK

- A. Fabricate supply ducts, return ducts, and exhaust ducts, plenum chambers, housings, panels, unless otherwise specified, from zinc-coated (galvanized) steel, lock-forming quality sheets conforming to ASTM A653/A653M and A924/A924M. Zinc coating designation: Z275 (G90), except Z600 (G210) where the metal is exposed to the weather or other locations where moisture could be present.
- B. PVC-Coated Galvanized Steel: UL 181, Class 1 listing. Lock-forming-quality, galvanized, sheet steel with ASTM A 653/A 653M, G90 (Z275) coating designation; factory-applied, 0.10-mm (4-mil) PVC coating on exposed surfaces of ducts and fittings (exterior of ducts and fittings for underground applications and interior of ducts and fittings for fume-handling applications) and with factory-applied, 0.05-mm (2-mil) PVC coating on reverse side of ducts and fittings.
- C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, exposed matte finish.
- D. Stainless Steel: ASTM A 480/A 480M, Type 316, sheet form with No. 4 finish for surfaces of ducts exposed to view; and Type 304, sheet form with No. 1 finish for concealed ducts.
- E. Aluminum Sheets: ASTM B 209 (ASTM B 209M), Alloy 3003, Temper H14, sheet form with standard, one-side bright finish for ducts exposed to view and with mill finish for concealed ducts.
- F. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- G. Tie Rods: Galvanized steel, 6-mm (1/4-inch) minimum diameter for 900-mm (36-inch) length or less; 10-mm (3/8-inch) minimum diameter for lengths longer than 900 mm (36 inches).
- H. Gauge numbers of metals indicated or specified represent the manufacturers' standard gauge numbers, prior to galvanizing.

2.02 DUCTS - RECTANGULAR

- A. Standards

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1. Construct rectangular ductwork to meet all functional criteria defined in the SMACNA "HVAC Duct Construction Standards - Metal and Flexible". Provide ductwork that complies with all local, state, and federal code requirements.
2. For ductwork with negative static pressures in excess of 750 Pa (3 inches w.g.), construct ductwork in conformance with the SMACNA "Rectangular Industrial Duct Construction Standards" and "Round Industrial Duct Construction Standards".

B. Proprietary Transverse Joints

1. "Ductmate" or "W.D.C.I." proprietary duct systems are an acceptable option if constructed in accordance with the manufacturer's guidelines for sheet gauge, intermediate reinforcement size and spacing, and joint reinforcements.
2. "T.D.C." and "T.D.F." formed on flanges are an acceptable option, provided they are constructed in accordance with SMACNA T-25a and T25b flanges respectively, as defined in the SMACNA "HVAC Duct Construction Standards - Metal and Flexible " and are provided with corner cleats, reinforcing stiffeners, bolts and gaskets on all pressure classes.

C. Joint and Fitting Requirements

1. On all rectangular transverse flanged connections, provide butyl gasket equal to Ductmate 440 or as approved. Provide gasketing that meets the requirement of UL- 723 and Fed Spec TT-C 1796A and TT-S-1657.
2. On all rectangular transverse flanged connections exposed to the weather, use continuous metal cleats on the top joints of the ducts.
3. On longitudinal seams, use Pittsburgh lock seams only. Snap-lock seams are not acceptable.
4. Make rectangular branch connections by means of parallel flow smooth radius connections. 45-degree branch connections may be used at branch flows of less than 25 percent of the upstream trunk flow and branch velocities equal to or less than the upstream trunk velocities. Straight tap connections are not acceptable.
5. Fabricate elbows in rectangular ductwork that are less than a full 90 degrees with smooth radius. Mitered elbows are not acceptable.
6. Provide all 90-degree elbows with smooth radius bends or turning vanes.
7. Provide 45-degree wye conical branch fittings at all round or flat oval branch connections to round or flat oval trunks or other branches where the upstream trunk or branch velocity is in excess of 10 meters per second (2000 feet per minute).
8. Bullhead tees are not acceptable. Fabricate divergent or convergent fittings with turning vanes or dual smooth radius elbows.

2.03 DUCTS – ROUND OR OVAL

- A. Conform to the SMACNA "Duct Construction Standards - Metal and Flexible", SMACNA "Round Industrial Duct Construction Standards", SMACNA "Accepted Industry Practice for Industrial Duct Construction", and ACGIH "Industrial Ventilation Manual"; except where provision of this Specification requires otherwise.

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- B. Provide round and flat oval ductwork of spiral seam construction only. Gauges in accordance with SMACNA Duct Construction Standards and fittings in accordance with SMACNA Duct Construction Standards, except as noted.
- C. Joints up to 500 mm (20 inches) in diameter (or larger dimension oval), interior slip coupling beaded at center, fastened to duct with sealing compound applied continuously around joint before assembling and after fastening. Wrap joints with 75-mm-wide (3-inch-wide) duct tape.
- D. Joints 520 to 1830 mm (21 to 72 inches) in diameter (or larger dimension oval), use 3-piece, gasketed, flanged joints consisting of two internal flanges (with integral mastic sealant) split to accommodate minor differences in duct diameter, and one external closure band designed to compress gasketing between internal flanges.
- E. Joints 1850 mm (73 inches) in diameter (or larger dimension oval) and up, use companion angle flanged joints only as defined on page 3-6 of the SMACNA manual. Refer to manual for proper sizing and construction details. Ductwall: welded longitudinal seams.
- F. Ductwork
 - 1. Spiral lock seam construction equal to United McGill Corp. "Uniseal Duct"; Pressure Airduct Corporation "Type SSD"; Lindab SPIROsafe; Tangent Air; Ductmate "Spiralmate/Ovalmate"; or Semco Mfg., Inc. "Semco Air System"; fabricated from galvanized sheets meeting ASTM A653, supplied in 3.7-meter (12-foot) lengths. Construction and gauges per the SMACNA "HVAC Duct Construction Standards - Metal and Flexible".
- G. Fittings
 - 1. Equal to United Sheet Metal Company "Uniform Fittings", manufactured from galvanized sheet meeting ASTM A653 with continuous welds in the following gages. Construction and gauges per the SMACNA "HVAC Duct Construction Standards - Metal and Flexible".
 - 2. Elbows: stamped up to 200 mm (8 inches) in diameter and 5-piece construction 225 mm (9 inches) in diameter and larger.
 - 3. Tees: conical type.
 - 4. Wyes: conical type.
 - 5. Close coupled double branch type fittings are not acceptable.

2.04 DUCT SEALING

- A. General
 - 1. Provide a tape and adhesive sealing system as manufactured by Hardcast, Inc.; Ductmate; United McGill Corporation; Foster Products Div., H.B. Fuller Co.; or 3M, equal to the Hardcast numbers listed and UL classified and complying with NFPA 90A, Class 1 requirements (flame spread of 25 and smoke developed of 50) when applied in a manner consistent with their intended use.

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2. Provide the duct sealing system for all metal ducts and duct system components including fittings.
 3. A seam is defined as the connection of two longitudinally (in the direction of the airflow) oriented edges of duct surface material occurring between two transverse joints.
 4. Joints are inclusive of but not limited to girth joints; branch and sub-branch intersections; so-called duct collar tap-ins; fitting subsections; louver and air terminal connections to ducts; access door and access panel frames and jambs; duct, plenum and casing abutments to building structures.
- B. Tape
1. Provide a woven cotton fiber tape impregnated with mineral gypsum compound equal to Hardcast "DT-5300" or "DT-5400".
 2. Provide tape 75 mm (3 inches) wide for standard slip and drive duct connections and 100 mm (4 inches) wide for standing seam joints.
- C. Adhesive – Indoor applications
1. Provided a white acrylic, non-flammable when wet or dry adhesive equal to Hardcast "FTA 20" with the following characteristics:
 - a. Peel Strength: 42-N/lin. cm. (24-lb./lin. inch), tested with Instron device.
 - b. Bonding time: Approximately 48 hours.
 - c. Service temperature: -17 to +93 deg. C (0 to + 200 deg. F).
 - d. Surface burning characteristics: Flame spread/smoke developed rating of 10/0, tested in accordance with UL 723.
 - e. Seal classes: All SMACNA classes
 - f. Pressure classes: SMACNA 0.13, 0.25, 0.50, 0.75, 1.0, 1.5, and 2.5 kPa (½, 1, 2, 3, 4, 6, and 10 inches water gauge).
- D. Adhesive – Indoor or Outdoor applications
1. Provide a modified styrene acrylic equal to Hardcast "RTA 50" with the following characteristics:
 - a. Peel Strength: 35-N/lin. cm. (20-lb./lin. in.), tested with Instron device.
 - b. Bonding Time: Approximately 48 hours.
 - c. Service temperature: -27 to +93 deg. C (0 to +200 deg. F).
 - d. Surface burning characteristics: Flame spread/smoke developed rating of 0/0, tested in accordance with ASTM E84.
 - e. Seal classes: All SMACNA classes.
 - f. Pressure classes: SMACNA 0.13, 0.25, 0.50, 0.75, 1.5 and 2.5 kPa (½, 1, 2, 3, 4, 6, and 10 inches water gauge).
- E. Gasketing
1. Gasket material for flanged connections: equal to Hardcast "Flange-Grip 1902-FR" extruded butyl flange gasket, cross section 4.76 mm by 15.88 mm (0.1875 inches by 0.625 inches).

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2.05 HANGER AND SUPPORT MATERIALS

- A. Provide hangers and supports that conform to requirements of Section IV of the SMACNA "HVAC Duct Construction Standards - Metal and Flexible", except that the friction clamp upper attachment device is not acceptable.
- B. Maximum hanger spacing: 2.4 meters (8 feet).
- C. Where hanger rod is used, provide all threaded type hanger rods of galvanized carbon steel complying with Section 230529 and ASME B1.1, Class 2A Fit USS National coarse thread conforming to MSS-SP-58.

2.06 DUCT ACCESSORIES

- A. Turning Vanes
 - 1. Provide square elbows with turning vanes. Provide turning vanes that are of a true airfoil design with a smoothly rounded entry nose and an extended trailing edge. Fabricate vanes of 26 gage hot-dip galvanized steel.
 - 2. Design vanes so that the generated sound power level does not exceed 54 decibels in Band 3 at a 10 meters per second (2000 feet per minute) duct velocity in a 600 x 600 mm (24 x 24 inch) duct with a maximum pressure drop of 0.026 kPa (0.105 in. wc.)
 - 3. Provide vanes with 24 gage hot-dip galvanized steel side rails and fasteners. Locate vane assembly slots in side rails on design center spacing of 61 mm (2.4 inches).
 - 4. H-E-P High Efficiency Profile turning vanes as manufactured by AERO/Dyne Co.; or as approved.
- B. Balancing Dampers
 - 1. General
 - a. Provide balancing dampers at all branch connections of the duct systems.
 - b. Provide dampers that are products of the manufacturers specified. Shop fabricated dampers are not acceptable.
 - c. Splitter dampers are not acceptable.
 - d. Provide single blade balancing dampers in rectangular ducts up to size 900 x 300 mm (36 x 12 inches).
 - e. Provide multiple blade balancing dampers in rectangular ducts larger than 900 x 300 mm (36 x 12 inches).
 - f. Provide single blade balancing dampers in all round and flat oval ducts.
 - 2. Single Blade Rectangular Duct Balancing Dampers
 - a. Provide damper frame fabricated of 22-gage galvanized steel with oilite bearings and:
 - b. 22 gage blades and 9.3mm (3/8-inch) axles on ducts up to 450 mm (18 inches) wide.
 - c. 16 gage blades and 12.5 mm (1/2 inch) axles on ducts up to 900 mm (36 inches) wide.

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- d. Provide dampers with square axle shafts extending beyond frame with factory supplied, locking hand quadrant for field mounting. Provide a 50 mm (2-inch) hand quadrant standoff mounting bracket for dampers installed in externally insulated ductwork.
- 3. Multiple Blade Rectangular Duct Balancing Dampers
 - a. Provide damper frame fabricated of 125 x 25 mm (5 x 1-inch) 16 gage galvanized steel channel with corner braces.
 - b. Provide 200 mm (8-inch) maximum width, 16-gage, galvanized steel opposed blade damper blades and damper linkage.
 - c. Provide damper blades with 12.5 mm (1/2-inch) hex axles with oilite bearings.
 - d. Provide damper with 12.5 mm (1/2-inch) round control shaft and locking hand quadrant. Provide the hand quadrant with a 50 mm (2-inch) standoff mounting bracket for dampers installed in externally insulated ductwork.
 - e. Maximum single section size: 1200 x 1200 mm (48 x 48 inches). Provide one hand quadrant per section on multiple section units.
- 4. Low Pressure Round Balancing Dampers
 - a. Provide low pressure round balancing dampers downstream of supply air terminal units and on round return/exhaust ducts.
 - b. Provide damper frames of galvanized steel construction:
 - 1) 112 mm (4-1/2 inches) x 20-gage thru 450 mm (18 inches) in diameter.
 - 2) 112 mm (4-1/2 inches) x 18-gage thru 600 mm (24 inches) in diameter.
 - c. Provide damper blades of single thickness galvanized steel construction:
 - 1) 22-gage thru 300 mm (12 inches) in diameter
 - 2) 20-gage thru 450 mm (18 inches) in diameter
 - 3) 16-gage thru 600 mm (24 inches) in diameter
 - d. Provide dampers with 9.3 mm (3/8-inch) square plated steel stub axles with lanced retainers and nylon bearings.
 - e. Provide dampers with a 9.3 mm (3/8-inch) square manual locking quadrant, shipped loose for field mounting.
- C. Backdraft Dampers
 - 1. Provide backdraft dampers on all exhaust and supply fans to ensure minimal air leakage when fan is not operating.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General
 - 1. Construct and install each duct system for the specific duct pressure classification indicated.

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2. Install round and flat-oval ducts in lengths not less than 3.7 m (12 feet), unless interrupted by fittings.
 3. Install ducts with fewest possible joints.
 4. Install fabricated fittings for changes in directions, changes in size and shape, and connections.
 5. Install couplings tight to duct wall surface with a minimum of projections into duct.
 6. Install ducts, unless otherwise indicated, vertically and horizontally, parallel and perpendicular to building lines; avoid diagonal runs.
 7. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
 8. Install ducts with a clearance of 25 mm (1 inch), plus allowance for insulation thickness.
 9. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions, unless specifically indicated.
 10. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.
- B. Electrical Equipment Spaces
1. Route ductwork to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
- C. Non-Fire-Rated Partition Penetrations
1. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same metal thickness as duct. Overlap opening on four sides by at least 38 mm (1- 1/2 inches).
- D. Fire-Rated Partition Penetrations
1. Where ducts pass through interior partitions and exterior walls, install appropriately rated fire damper, sleeve, and firestopping sealant.
- E. Hangers and Supports
1. Hot-dip galvanize all components of all hangers and supports.
 2. Install hangers and supports in conformance with the requirements of the SMACNA "Duct Design Construction Standards", except where provisions of this specification require otherwise.
 3. Support vertical ducts through floor slabs on two sides by steel angles bolted to the duct and rest with ample bearing surface on the floor slab. Bolt supporting angles to the floor, ceiling, or wall. Provide supporting angles of size 38 by 38 by 3-mm (1-1/2 by 1-1/2 by 1/8-inch) for ducts up to 1200 mm (48 inches) wide and 50 by 50 by 5-mm (2 by 2 by 3/16-inch) for ducts over 1200 mm (48 inches) wide. In open shafts, provide additional structural members to span openings for support of ducts and angles at each floor. Support ducts along walls spaced not more than 2.4 meters (eight feet) apart.

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4. Maintain the maximum headroom possible under ducts and supports and in no case be less than 2.4 meters (eight feet) above the floor except where shown or with specific written approval of the Architect.
5. Attach ductwork supported by steel straps to the bottom flange of beams by means of C-clamps with set screw. Place C-clamps on the up-stream side of the beam.
6. Attach ductwork supported by rod to the bottom flange of beams by C-clamps with retaining clips. Place C-clamps on the up-stream side of the beam.
7. Exercise care not to overtighten the set screw on C-clamps and thereby over-stress the jaw.
8. In steel structures with joist or truss members, attach hangers for ductwork wider than 1 m (3 feet) at panel points
9. Furnish inserts and make provisions for their installation. Whenever hanger rods for ducts cannot be supported from the structural steel or from inserts in the concrete, provide any additional steel, as required. All additional steel to be prime painted.
10. Support ductwork directly from the building structure and not from the supporting systems or equipment of other trades.

F. Galvanizing Repair

1. If galvanized ductwork is welded or coating is disturbed, paint the disturbed areas to maintain the corrosion resistant surface of the galvanizing.

G. Access Panels in Ductwork

1. Provide access panels of adequate size in ductwork to permit cleaning, inspection, adjustment and maintenance of the duct system and components such as automatic, fire or smoke dampers, control devices, coils and humidifiers.
2. Install panels to open against air pressure to utilize air pressure in sealing of gaskets.
3. Install panels rigidly framed and gasketed to prevent air leakage.

H. Duct Reinforcement

1. Provide duct reinforcement that complies with the reinforcement criteria and produces the allowable deflection limits as listed in the SMACNA "HVAC Duct Construction Standards - Metal and Flexible".

I. Easements

1. Provide necessary easements in sheet metal work for pipes, conduit equipment, building construction and headroom even though not specifically shown. Provide transformations that maintain the equivalent duct area and have good aerodynamic proportions. Where an obstruction absolutely cannot be avoided and must penetrate the duct, form a streamlined collar around the obstruction. When the duct area is reduced more than 10 percent by the collar, increase the duct size to maintain the original duct area.

J. Offsets in Ducts

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1. Make offsets in ducts to avoid interferences or adjust the horizontal or vertical position of the duct, whether or not these are specifically shown.
2. Make offsets with radius turns or mitered turns with the appropriate turning vanes.
3. Offsets that reduce the cross-sectional flow area of the duct will not be permitted.

K. Duct Sealing System Application

1. Seal all supply, return and exhaust air ducts in accordance with the SMACNA "HVAC Duct Construction Standards - Metal and Flexible", Table 1-2, STANDARD DUCT SEALING REQUIREMENTS.
2. The requirement to seal applies to both positive and negative pressure modes of operation.
3. Apply seam and joint sealant to the duct after the duct is erected with fasteners and hangers in place and complete.
4. Seams and joints down stream of volume control boxes in rooms without ceilings need not be sealed.
5. Seams in return and exhaust ductwork in less than 0.50 kPa (2-inch w.g.) class need not be sealed.
6. Helical (spiral) lock seams are exempt from sealing requirements.
7. Clean all surfaces of dirt, oil, grease and loose or foreign matter that could impair adhesion, using soap and water or solvent. Allow surfaces to dry completely before proceeding.
8. Apply two-part tape/adhesive sealant system to duct joints and seams in accordance with the manufacturer's recommendations.
9. Saturate the tape with adhesive, using an applicator or brush. Remove excess adhesive.
10. Place wet tape on duct joint or seam. Lap tape end joints 50-mm (2-inches) minimum.
11. Smooth out wrinkles, bubbles, and voids by hand or brush.
12. Completely seal duct joints and seams without voids.
13. Allow the duct sealing system to cure for a minimum of 48 hours before pressure testing.

L. Round "Spin-In" Fittings

1. Use round "spin-in" fittings whenever round branch connections are required to be made to rectangular supply air ducts.
2. If the round diameter exceeds the rectangular duct depth, use a 45-degree rectangular to round take-off fitting in lieu of the spin-in fitting.

3.02 FIELD QUALITY CONTROL

A. Testing Ductwork

1. Leak test the duct construction on all supply, return and exhaust air ducts in systems constructed to 4-inch w.g. class and higher. Testing of sections of the duct systems is allowable.

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2. Follow the outlines and classifications in the SMACNA "HVAC Duct Leakage Test Manual", latest edition, for leakage test procedures.
3. Do not exceed the allotted leakage amount for the pressure class or the allotted amount for that portion of the system, whichever is applicable.
4. If the duct system or test section fails to meet the allocated leakage level, re-seal and re-test until acceptable leakage is demonstrated.
5. Complete tests and necessary repairs prior to insulation or concealment of ducts. Allow sufficient drying or curing time for the sealant prior to test and re-test, in accordance with the SMACNA "HVAC Duct Leakage Test Manual", latest edition.

- B. Cover all openings in ductwork during construction to minimize the amount of dust and debris entering the ductwork system per CGC.

3.03 CLEANING

- A. Mark position of dampers and air-directional mechanical devices before cleaning and perform cleaning before air balancing.
- B. Use service openings, as required, for physical and mechanical entry and for inspection
1. Create other openings to comply with duct standards.
 2. Disconnect flexible ducts as needed for cleaning and inspection.
 3. Remove and reinstall ceiling sections to gain access during the cleaning process.
- C. Vent vacuuming system to the outside. Include filtration to contain debris removed from HVAC systems, and locate exhaust down wind and away from air intakes and other points of entry into building.
- D. Clean the following metal duct systems by removing surface contaminants and deposits:
1. Air outlets and inlets (registers, grilles, and diffusers).
 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
 4. Coils and related components.
 5. Return-air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.
 6. Supply-air ducts, dampers, actuators, and turning vanes.
- E. Mechanical Cleaning Methodology:
1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.

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2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

F. Cleaning of Outside Ductwork Surfaces

1. On rectangular uninsulated ductwork and fittings exposed in finished spaces, remove the fabrication labels and glue from the exterior surfaces after installation.

END OF SECTION

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SECTION 26 01 00 – BASIC ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the basic requirements for the electrical work on this project
- B. Work Included
 - 1. Furnish and install a fully functional electrical power system including all panelboards, breakers, wiring, relays, and other material as shown on in the Electrical Drawings and specified herein. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that any power supplies, disconnect, relays, controls, programming or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
 - 2. Site and System Investigation: The bidding contractor for the electrical power system shall visit the site prior to the bid and become thoroughly knowledgeable about the existing system and work required to perform work of this section. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.
 - 3. Utility Coordination: The contractor shall be responsible for coordinating the additional electrical load for this project with the electrical utility provider serving the facility.

1.02 REFERENCES AND STANDARDS

- A. California Electrical Code (CEC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Energy Code (CENC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. National Electrical Contractors Association (NECA): Standard of Installation
- D. National Fire Protection Association (NFPA): 70E
- E. National Safety Council (NSC)
- F. Occupational Safety and Health Administration (OSHA)

1.03 SUBMITTALS

- A. Product Data

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- B. Operation and Maintenance (O&M) Manuals
- C. Field Test Reports (including Energy Code Acceptance Tests)

1.04 QUALITY ASSURANCE

- A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.
- C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:
 - 1. California Electrical Code (CEC)
 - 2. California Building Code (CBC)
 - 3. California Green Building Code (CGC)
 - 4. California Fire Code (CFC)
 - 5. California Energy Code (CENC)
 - 6. California Mechanical Code (CMC)
 - 7. California Plumbing Code (CPC)
- D. Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:
 - 1. ACI American Concrete Institute
 - 2. ANSI American National Standards Institute
 - 3. ASTM American Society for Testing Materials
 - 4. AWS American Welding Society
 - 5. CBM Certified Ballast Manufacturers
 - 6. ETLElectrical Testing Laboratories
 - 7. FS Federal Specification
 - 8. IEEE Institute of Electrical and Electronics Engineers, Inc.
 - 9. IPCEA Insulated Power Cable Engineer Association
 - 10. NEMA National Electrical Manufacturer's Association
 - 11. UL Underwriters' Laboratories
- E. Independent Testing Agency qualifications:
 - 1. Testing Agency shall be an independent testing organization that will function as an unbiased authority, professionally independent of Manufacturer, Supplier and Contractor, furnishing and installing equipment or system evaluated by Testing Agency.

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2. Testing Agency shall be regularly engaged in the testing of electrical equipment, devices, installations, and systems.
3. Testing Agency shall meet Federal Occupational Safety and Health Administration (OSHA) requirements for accreditation of independent testing laboratories, Title 9, Part 1907.
4. On-site technical personnel shall be currently certified by the International Electrical Testing Association in electrical power distribution system testing.
5. Testing Agency shall use technicians who are regularly employed by the firm for testing services.
6. Contractor shall submit proof of above Testing Agency qualifications with bid documentation upon request.

F. All base material shall be ASTM and/or ANSI standards.

G. All electrical apparatus furnished under this Section shall conform to NEMA standards and the NEC and bear the UL label where such label is applicable.

PART 2 - PRODUCTS

2.01 CONDUCTORS

A. SEE ELECTRICAL DRAWINGS

2.02 PANELBOARDS

A. SEE ELECTRICAL DRAWINGS

2.03 TRANSFORMERS

A. SEE ELECTRICAL DRAWINGS

2.04 PULL BOXES

A. Provide traffic rated pull boxes for power and signal as noted in the Electrical Drawings

2.05 CIRCUIT BREAKERS

A. Unless noted otherwise, circuit breakers shall be molded case, bolt on and trip indicating.

B. Where stationary molded case circuit breakers are indicated on the Drawings to be current limiting type, they shall be current limiting as defined by UL 489 and shall not employ any fusible elements.

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- C. Circuit breakers shall have interrupting capacity not less than that indicated on the Drawings or if not indicated, not less than 25,000 RMS symmetrical amps for 480 volt systems and 10,000 RMS symmetrical amps for 208 volt systems.
- D. Covers shall be sealed on non-interchangeable breakers and trip unit covers shall be sealed on interchangeable trip breakers to prevent tampering. Circuit breaker ratings shall be clearly visible after installation or engraved nameplates shall be provided stating the rating. All ferrous parts shall be plated to minimize corrosion.
- E. Circuit breakers shall be toggle, quick-make and quick-break operating mechanisms with trip-free feature to prevent contacts being held closed against overcurrent conditions in the circuit. Trip position of the breakers shall be clearly indicated by operating handles moving to a center position.
- F. Multipole breakers shall have a single handle to open and close all contacts simultaneously in both manual operation and under automatic tripping. Interpole barriers shall be provided inside the breaker to prevent any phase-to-phase flashover. Each pole of the breaker shall have means for Arc extinguishing.
- G. All terminals shall be rated for aluminum or copper wire.
- H. Unless noted otherwise, circuit breakers with trip ratings 400 amp and smaller shall be ambient temperature compensated, thermal magnetic type unless otherwise noted. Breakers shall be of full size, 1" per pole type. Panels with more than one branch breaker larger than 100 amps shall be installed in distribution type panels.
- I. Accessories: Provide accessories as noted on the Drawings, i.e. shunt-trip, auxiliary contacts, undervoltage trip, alarm switch, etc.
- J. Spaces in the boards shall be able to accept any combination of 1, 2 or 3 pole circuit breakers as indicated. Provide all necessary bus, device supports and mounting hardware sized for frame, not trip rating.
- K. Series rated breakers are not acceptable unless specifically noted on the Drawings.

2.06 RECEPTACLES

- A. Standards:
 - 1. Provide general purpose 20 ampere, 125/250 VAC receptacles that conform to NEMA WD-1 Specifications. Specialty receptacles shall conform to NEMA WD-5 Specifications as applicable.
 - 2. Provide NEMA 5-20R, commercial specification grade as noted herein, 20 amp, 125 VAC, 2 pole, 3 wire grounding type receptacles.
 - 3. Receptacles shall be the standard conventional style device.
- B. Color:
 - 1. Device color shall be as selected by the Architect, unless otherwise noted.

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- C. General purpose single outlets:
 - 1. Provide self-grounding back and side wired with binding head staked terminal screw.
- D. General purpose duplex receptacles:
 - 1. Provide self-grounding, back and side wired with binding head staked terminal screws and break-off strip for two-circuit wiring.
- E. Tamper-resistant single outlets:
 - 1. Provide self-grounding back and side wired with binding head staked terminal screw.
 - 2. Shall have tamper-resistant feature and shall conform to CEC Article 406.12.
- F. Tamper-resistant duplex receptacles:
 - 1. Provide self-grounding, back and side wired with binding head staked terminal screws and break-off strip for two-circuit wiring.
 - 2. Shall have tamper-resistant feature and shall conform to CEC Article 406.12.
- G. Ground-fault circuit interrupting (GFCI) receptacles:
 - 1. Provide 20 amp, 125 VAC, receptacles consisting of NEMA 5-20R duplex device with integral solid state sensing and signaling circuitry capable of detecting and interrupting a maximum 5 milli-amp line-to-ground fault current in approximately 1/40th of a second.
 - 2. Provide visual device with trip indication, manual reset and test mechanisms and with point of use and multi-outlet protection.
 - 3. Shall have tamper-resistant feature and shall conform to CEC Article 406.12.
- H. Special purpose receptacles: Provide Specification grade devices with the NEMA configuration, voltage and current rating, number of poles and ground provisions as noted on the Drawings.

2.07 COVER PLATES

- A. General:
 - 1. Provide all coverplates with rounded edges and corners, smooth and free of grooves, embossing or other embellishment.
 - 2. Provide mounting screws to match the plate finish.
 - 3. Provide gang type coverplates where two or more devices are installed at one location. Individual gangable coverplates are not acceptable.
 - 4. Provide plates of one design throughout the Project unless otherwise specified.
- B. Color:
 - 1. Coverplate color shall be as specified by the Architect, unless otherwise noted.
- C. Plastic coverplates:
 - 1. Provide smooth, high impact, self-extinguishing thermoplastic coverplates and 0.100 inches thick with rounded edges and corners.

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2. Provide openings to accommodate the devices indicated on the Drawings and in the Specifications.
- D. Metal coverplates:
 1. Provide smooth, type 430 stainless steel coverplates, 0.035" thick with rounded edges and corners.
 2. Provide openings to accommodate the devices indicated on the Drawings and in the Specifications.
- E. Outdoor covers:
 1. Provide in-use weatherproof, metal, lockable outlet covers for all receptacles installed in outdoor locations.

PART 3 - EXECUTION

3.01 ROUGH-IN

- A. Contractor shall verify lines, levels and dimensions indicated on the construction document drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.
- B. Verify final locations for rough-ins with field measurements and with the requirements for the actual equipment to be connected.
- C. Refer to equipment specifications in other sections for equipment rough-in requirements.

3.02 INSTALLATION

- A. Preparation, sequencing, handling, and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified.
- B. Comply with Manufacturer Shop Drawings.
- C. Verify all dimensions by field measurements.
- D. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
- E. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
- F. Sequence, coordinate and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.

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- G. Where mounting height is not detailed or dimensioned, contact the Architect for direction prior to proceeding with rough-in.
 - H. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies and controlling agencies. Provide required connection for each service.
 - I. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the construction documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
 - J. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - K. Install electrical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
 - L. Coordinate electrical systems, equipment, and materials installations with other building components.
 - M. Provide access panel or doors where devices or equipment are concealed behind finished surfaces.
 - N. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.
 - O. Conform to the National Electrical Contractors' Association "Standard of Installation" for general installation practice.
- 3.03 CUTTING, PATCHING, PAINTING, AND SEALING
- A. Structural members shall in no case be drilled, bored, or notched in such a manner that will compromise their structural integrity. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.
 - B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
 - C. Application of joint sealers:
 - 1. General: Comply with joint sealer Manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.

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2. Installation of fire-stopping sealant: Install sealant, including forming, packing and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide fire-stops and fire-resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

3.04 FIELD QUALITY CONTROL

- A. General testing requirements:
 1. The purpose of testing is to ensure that all tested electrical equipment, both Contractor and Owner supplied, is operational and within industry and Manufacturer's tolerances and is installed in accordance with design Specifications.
 2. Tests and inspections shall determine suitability for energization.
 3. Perform tests in presence of the Owner's Representative and furnish test equipment, facilities and technical personnel required to perform tests.
 4. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications.
- B. Tests: In addition to specific system test described elsewhere, tests shall include:
 1. Equipment operations: Test motors for correct operation and rotation.
 2. Lighting control circuits: Test lighting circuits for correct operation through their control devices.
 3. Alarm and interlock systems: Produce malfunction symptoms in operating systems to test alarm and interlock systems. In addition, all specific tests described in the fire alarm system shall be performed.
 4. Circuit numbering verification: Confirm all circuit breakers in the panelboards are correctly labeled in agreement with typed panel directories with actual field wiring.
 5. Voltage check:
 - a. At completion of job, check voltage at several points of utilization on the system that has been installed under this Contract. During test, energize all installed loads.
 - b. Adjust taps on transformers to give proper voltage, which is 118 to 122 volts for 120 volt nominal systems and proportionately equivalent for higher voltage systems. If proper voltage cannot be obtained, inform the Owner and the serving Utility Company.
- C. Contractor shall provide test power required when testing equipment before service energization and coordinate availability of test power with General Contractor after service energization. The Contractor shall provide any specialized test power as needed or specified herein.
- D. Testing safety and precautions:
 1. Safety practices shall include the following requirements:
 - a. Applicable State and Local safety operating procedures.

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- b. OSHA
 - c. NSC
 - d. NFPA 70E
 - 2. All tests shall be performed with apparatus de-energized and grounded except where otherwise specifically required ungrounded by test procedure.
- E. Calibration of test equipment:
- 1. Testing Agency shall have calibration program that assures test instruments are maintained within rated accuracy.
 - 2. Instruments shall be calibrated in accordance with the following frequency schedule:
 - a. Field instruments: Analog, 6 month maximum; Digital, 12 months maximum.
 - b. Laboratory instruments: 12 months.
 - c. Leased specialty equipment: 12 months where accuracy is guaranteed by lessor.
 - 3. Dated calibration labels shall be visible on test equipment.
 - 4. Records, which show date and results of instruments calibrated or tested, must be kept up-to-date.
 - 5. Up-to-date instrument calibration instructions and procedures shall be maintained for test instrument.
 - 6. Calibration standards shall be of higher accuracy than instrument tested.
 - 7. Equipment used for field testing shall be more accurate than instrument being tested.
- F. Coordinate with General Contractor regarding testing schedule and availability of equipment ready for testing.
- G. Notify Owner one week in advance of any testing.
- H. Any products which fail during the tests or are ruled unsatisfactory by the Owner's Representative shall be replaced, repaired, or corrected as prescribed by the Owner's Representative at the expense of the Contractor. Tests shall be performed after repairs, replacements or corrections until satisfactory performance is demonstrated.
- I. Testing Agency shall maintain written record of tests and shall assemble and certify final test report. All test results/reports shall be submitted to the Electrical Engineer for review.
- J. Include all test results in the maintenance manuals.
- 3.05 CLEANING
- A. Prior to energizing of electrical equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.

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- B. Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all electrical equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.
- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

3.06 ENERGY CODE COMPLIANCE

- A. NRCC: Per Title 24, Part 6 California Energy Code (CENC) the Non-Residential Certificates of Compliance (NRCC) shall be included in the Contract Documents. The NRCC outlines the specific requirements for how the project meets or exceeds CENC. Including what equipment, fixtures, and controls must be installed and how they are installed. The Contractor shall review the NRCC forms and coordinate all requirements with the applicable parties.
- B. NRCI: Upon installation of the applicable equipment, fixtures, and controls, the Contractor shall provide and complete the required Non-Residential Certificates of Installation (NRCI) as listed in the NRCC forms. The NRCI form verifies that what was installed matches what was specified in the NRCC.
- C. Acceptance Tests (NRCA): After initial start-up of the applicable equipment, fixtures, and controls, the Contractor shall conduct Acceptance Testing per CENC requirements. The Contractor shall be responsible for all testing and ensure the testing is documented in the applicable Non-Residential Certificate of Acceptance (NRCA) forms. The lighting Acceptance Testing shall be conducted by a technician that is certified with one of the California Energy Commission's approved Acceptance Test Technician Certification Providers (ATTCP).
- D. Upon completion of the project, the Contractor shall provide all energy compliance forms to the Owner.

END OF SECTION

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SECTION 26 05 33 – ELECTRICAL RACEWAYS AND BOXES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes conduit, surface raceways, J-hooks, wireways, outlet boxes, pull and junction boxes, concrete pullboxes and vaults, floor boxes.

1.02 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
- B. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 5. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
 - 6. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
 - 7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.03 SYSTEM DESCRIPTION

- A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.
- B. All wiring shall be installed in raceway.
- C. Provide raceway as follows:
 - 1. Underground: Provide thickwall nonmetallic conduit. Provide cast metal boxes or nonmetallic handhole.
 - 2. In Slab Above Grade: Not permitted.
 - 3. Below Slab on Grade: Use thickwall nonmetallic conduit. Terminate with coated rigid steel elbows and short length of coated rigid steel conduit out of concrete.

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4. Outdoor Locations, Above Grade: Provide galvanized rigid steel conduit. Provide cast metal outlet, pull, and junction boxes.
5. Wet and Damp Locations: Provide galvanized rigid steel conduit. Provide cast metal outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.
6. Concealed Dry Locations: Provide electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes where shown on drawings. Provide J-hooks when shown on plans.
7. Exposed Interior Dry Locations: Use rigid steel conduit or intermediate metal conduit below eight feet or where subject to damage. Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing above eight feet or in electrical, mechanical or telecommunication rooms. Use sheet-metal or cast metal boxes. Use flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.04 DESIGN REQUIREMENTS

- A. Minimum Raceway Size: 0.75 inch unless otherwise specified.
- B. Minimum Raceway Size for Data Communications: 1.00 inch unless otherwise specified.
- C. Minimum Raceway Size for Telecommunications: 1.00 inch unless otherwise specified.
- D. Minimum Raceway Size for AV Systems: 1.00 inch unless otherwise specified.

1.05 CLOSEOUT SUBMITTALS

- A. Project Record Documents:
 1. Record actual routing of conduits larger than 2 inches.
 2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- B. Protect PVC conduit from sunlight.

1.07 COORDINATION

- A. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

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- B. Coordinate Work of this Division and Work of other Divisions in advance of installation. Provide additional Work to overcome tight conditions at no increase in Contract Sum.
- C. Coordinate installation of outlet boxes for equipment specified in other divisions.

PART 2 - PRODUCTS

2.01 METAL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Rigid Aluminum Conduit: ANSI C80.5.
- C. Intermediate Metal Conduit (IMC): Rigid steel.
- D. Fittings and Conduit Bodies: NEMA FB 1. Fittings shall be steel/malleable iron with threaded fittings. Use insulated metallic bushings with lug where ground connections are required. Use plastic bushing for non-bonding applications.

2.02 PVC COATED METAL CONDUIT

- A. Product Description: NEMA RN 1; rigid steel conduit with external PVC coating, 40 mil thick.
- B. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.03 FLEXIBLE METAL CONDUIT

- A. Product Description: Interlocked steel construction.
- B. Fittings: NEMA FB 1.

2.04 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Product Description: Interlocked steel construction with PVC jacket.
- B. Fittings: NEMA FB 1.

2.05 ELECTRICAL METALLIC TUBING (EMT)

- A. Product Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: NEMA FB 1; steel couplings and connectors. Box connectors shall have with insulated throat. Set screw type couplings.

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2.06 NONMETALLIC CONDUIT

- A. Product Description: NEMA TC 2; Schedule 40 PVC.
- B. Fittings and Conduit Bodies: NEMA TC 3.

2.07 SURFACE RACEWAY (WIREMOLD)

- A. Product Description: Surface raceway as shown on plans. Raceway shall be Wiremold or equal.
- B. Fittings: Provide all supports, adapters, clips, elbows, covers, device fittings, and other hardware as required for a complete installation. Provide B-Line "transition" boxes to clear offset surfaces. Supports shall be concealed, exposed straps are not allowed.
- C. Finish:
 - 1. Steel raceway and associated transition boxes and exposed hardware shall be spray painted with two coats of semi-gloss acrylic enamel paint, color as directed by Architect.
 - 2. Aluminum raceway shall be provided with factory finish, color as directed by Architect. Transition boxes shall be spray painted with two coats of semi-gloss acrylic enamel paint, color as directed by Architect.
 - 3. Plastic raceway shall be provided with factory finish, color as directed by Architect. Transition boxes shall be spray painted with two coats of semi-gloss acrylic enamel paint, color as directed by Architect.
 - 4. Coordinate all colors with Architect prior to ordering.

2.08 J-HOOKS

- A. Product Description: Low voltage signal cable J-Hooks shall be Panduit. Provide with support device for construction encountered.

2.09 WIREWAY

- A. Product Description: General purpose for indoor applications and raintight type for outdoor locations wire way.
- B. Knockouts: Manufacturer's standard.
- C. Cover: Hinged cover with full gaskets.
- D. Connector: Flanged.
- E. Fittings: Lay-in type with removable top, bottom, and side; captive screws and drip shield for outdoor.

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- F. Finish: Rust inhibiting primer coating with gray enamel finish.

2.10 OUTLET BOXES

- A. All boxes shall be suitable for the environment in which they are installed.
- B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 0.5-inch male fixture studs where required.
 - 2. Boxes for shall be 1.5-inch-deep by 4-inch square minimum for single devices.
 - 3. Boxes for shall be 1.5-inch-deep by 4-11/16 inch square minimum for two devices.
 - 4. Boxes for data and signal outlets shall be 2-1/8-inch-deep by 4-11/16-inch square minimum.
 - 5. Concrete Ceiling Boxes: Concrete type.
 - 6. Provide rings as required.
- C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

2.11 BOX EXTENSIONS

- A. At rooms being remodeled and where existing walls are to receive new finish material, replace existing plaster rings with new rings.

2.12 PULL AND JUNCTION BOXES

- A. Boxes having an internal volume less than 100 cubic inches shall be as specified for outlet boxes. Boxes having internal volume greater than 100 cubic inches shall be of panelboard type construction except that covers shall be secured by screws or bolts.
- B. Boxes exposed to rain or installed in wet locations shall be specifically designed for the purpose.
- C. All boxes shall be installed so that covers are accessible after completion of the installation.
- D. Boxes shall not be installed in finished areas unless specific approval for such installation is granted by Architect.

2.13 CONCRETE PULLBOXES AND VAULTS

- A. Boxes: Boxes shall be precast, high density reinforced concrete. In areas of vehicular traffic, boxes shall be H20 rated.

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- B. Extensions: Extensions shall be provided at each pullbox. Provide a minimum of (1) extension. Provide additional extension(s) as required to provide space in box for code required cable bending.
- C. Covers: Covers in concrete or asphalt shall be galvanized. In all other areas, covers shall be steel checker plate. In areas of vehicular traffic, lids shall be galvanized steel, H20 rated. All covers shall be provided with hold-down bolts.
- D. Floor: Provide poured concrete slab as detailed on plans. At H20 rated boxes, provide manufacturer's concrete slab.
- E. Size: Provide size as noted on plans. If size is not shown, provide boxes sized per codes.
- F. Labeling: Covers shall be factory marked as shown on plans.

2.14 FLUSH MULTI SERVICE FLOOR BOXES (4 PORT)

- A. Floor boxes shall be cast iron, fully adjustable, Walker RFB4-CI-1 with FPBTCAL cover. Provide brackets required to mount devices shown on plans. Provide blank plates at unused ports.

2.15 FLUSH MULTI SERVICE FLOOR BOXES (11 GANG):

- A. Floor boxes shall be steel, fully adjustable, Walker RFB11 with RFB119BTCAL cover. Provide brackets required to mount devices shown on plans. Provide blank plates at unused ports.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.02 EXISTING WORK

- A. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces.
- B. Remove concealed abandoned raceway to its source.
- C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.

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- D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.
- E. Extend existing raceway and box installations using materials and methods [compatible with existing electrical installations, or] as specified.
- F. Clean and repair existing raceway and boxes to remain or to be reinstalled.
- G. At rooms being remodeled and where existing walls are to receive new finish material, replace existing plaster rings with new rings with depth required to bring box flush with new finish. Contractor shall review Architectural drawings prior to bid to note walls receiving new finishes (tackboards, sheetrock, etc.) and include the necessary work in bid.

3.03 INSTALLATION

- A. Ground and bond raceway and boxes.
- B. Fasten raceway and box supports to structure and finishes.
- C. Identify raceway and boxes.
- D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.04 INSTALLATION - RACEWAY

- A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.
- B. Unless otherwise specified, all raceway shall be installed concealed. Raceway may be run exposed on unfinished walls, in attic spaces, in electrical rooms and when routed to surface panels, cabinets or gutters.
- C. Arrange raceway supports to prevent misalignment during wiring installation.
- D. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Group related raceway; support using conduit rack. Construct rack using steel channel and provide space on each for 25 percent additional raceways.
- F. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports
- G. Do not attach raceway to ceiling support wires or other piping systems.

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- H. Construct wire way supports from steel channel.
- I. Route exposed raceway parallel and perpendicular to walls.
- J. Route raceway installed above accessible ceilings parallel and perpendicular to walls.
- K. Route conduit in and under slab from point-to-point.
- L. Maintain clearance between raceway and piping for maintenance purposes.
- M. Maintain 12-inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.
- N. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- O. Bring conduit to shoulder of fittings; fasten securely.
- P. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.
- Q. Install conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- R. Install no more than equivalent of three 90-degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install factory elbows for bends in metal conduit larger than 2-inch size.
- S. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.
- T. Install fittings to accommodate expansion and deflection where raceway crosses seismic and expansion joints.
- U. Install suitable pull string or cord in each empty raceway except sleeves and nipples.
- V. Install suitable caps to protect installed conduit against entrance of dirt and moisture.
- W. Surface Raceway:
 - 1. Anchor raceway to structural members using screws. Supports shall be concealed. Space screws 24" maximum on center. Each run shall have a minimum of (2) screws.
 - 2. Mount plumb and level.
 - 3. Install insulating bushings and inserts at connections to outlets and corner fittings.

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4. Raceway shown on plans is schematic. Contractor shall coordinate exact routing and installation with building conditions and provide all parts, pieces, elbows, transition boxes and other items as required for a complete, closed and professionally installed installation.
5. Coordinate exact routing with Architect prior to installation.

X. J-Hooks:

1. Provide J-hooks 48" maximum on center.
2. All cable to be run parallel and perpendicular to building lines.
3. Provide mounting hardware as required.
4. Provide Unistrut channels between structural members as required.
5. Provide 24" long 2" conduit sleeves through walls, draft stops, etc. Provide as many as necessary to accommodate cables in contract plus two extra capped at each end for future cabling. All conduits shall be provided with bushed ends.

Y. Close ends and unused openings in wire way.

3.05 EXCAVATING AND TRENCHING:

- A. Perform all excavations as required for the installation of the work included under this Section, including shoring of earth banks to prevent cave-ins and to protect workmen and equipment.
- B. Restore all surfaces, roadways, walks, curbs, walls, existing underground installation, etc., damaged or cut as a result of the excavations to their original condition in a manner approved by the Architect.
- C. Stop machine excavation for trenches, in solid ground, several inches above required grade line, then trim trench bottom by hand to accurate grade so that a firm and uniform bearing throughout entire length of duct is provided. In lieu of above hand excavation in bottom of trench, Contractor may excavate to depth no less than 6" below required grade line and place a bed of sand or granular soil, properly compacted to provide a uniform grade and to provide a firm support for duct throughout its entire length.
- D. Minimum conduit depth of pipe crown shall be 2'0" below finished or natural grade, unless detailed otherwise on Drawings. Conduits under parking lots, roadways, driveways, fire truck access routes, and other areas subject to vehicular traffic shall be installed a minimum of 24" below grade.

3.06 BACKFILLING:

- A. No backfilling operations shall begin until the required tests and inspection has been made. Should any of the work be enclosed or covered up before it has been approved, Contractor shall, at his expense, uncover the work.

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- B. After it has been inspected, tested, and approved, he shall make all repairs necessary to restore the work of other contractors to the condition in which it was found at the time of uncovering.
- C. Except under existing paved area, walks, roads, or similar surfaces, and in cases where rock is encountered, backfill more than 12" above the top of the pipe shall be made using suitable excavated material placed in 6" layers measured before compaction, and tamped by machine.
- D. Surface work shall be replaced to match the existing.
- E. Entire backfill for bored excavations under existing pavement, walks, roads, or similar surfaces, shall be made with clean sand compacted by flooding.
- F. The contractor shall install a marking tape 6" below grade and directly above all electrical conduits. The tape shall consist of a 4 mil insert plastic film specifically formulated for prolonged use underground. It shall be highly resistant to alkalis, acids and other destructive agents found in the soil. Tape shall have a minimum tensile strength of 20 lbs. per 3" with strips and a minimum elongation of 500%. Tape shall bear a continuous painted message repeated every 16" to 36" warning of the installation buried below. The message shall read "CAUTION – ELECTRICAL POWER LINE BURIED BELOW" or "CAUTION – ELECTRICAL SIGNAL LINES BURIED BELOW" as applies. Installation instruction for the tape shall be printed with each message along the entire length. The tape shall be as that manufactured by Reef Industries, Inc., or approved equal. For those installations involving non-metallic pipe, tape shall be aluminum foil encased in two layers of inert plastic film enabling the tape to be inductively located. Terre Tape "D" Warning Tapes are acceptable. When conduit below is plastic, tape shall have metallic content and shall respond to metal detectors. Do not exclude this. It will be required to verify the installation of this tape.

3.07 FLASHING AND SEALING:

- A. Flash and counterflash roof and wall penetrations in manner described under other applicable sections of this Specification and as approved by the Architect.
- B. Conduits, ducts, etc., passing through finished walls and ceilings shall be fitted with steel escutcheon plates, chrome or paint finish as directed.
- C. Conduits which penetrate floor slabs and concrete or masonry walls shall be grouted and sealed watertight at penetration.
- D. Conduits penetrating exterior walls other than concrete or masonry shall be sealed watertight with polyurethane sealant.
- E. Underground conduits stubbing up into a room shall be sealed around cables or pullstring with foam sealant.

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- F. All flashing and sealing shall be provided by this Contractor.

3.08 INSTALLATION – BOXES

- A. Boxes shall be accurately placed as shown on Drawings or as close thereto as possible. Contractor shall refer to Drawings, specifications, and submittals covering work of the other trades to coordinate outlet location. In the event of conflict between planned locations of outlet and other equipment or furnishing, Contractor shall not proceed until direction has been given by Architect.
- B. Unless otherwise specified or shown on Drawings, boxes shall be flush mounted with front edge of box or ring flush with wall or ceiling finish. Use plaster ring of appropriate depth in plastered or gypboard applications. Contractor shall review architectural drawings and note wall and ceiling construction and finishes for each wall.
- C. Boxes shall not be installed back-to-back in walls. To prevent sound transfer, outlets, switches, etc. shown on opposing sides of the same wall shall be installed in separate stud spaces, except that outlets installed at different elevations may occupy the same stud space when box separation exceeds 18". Where these requirements cannot be met, Contractor shall provide insulation material between boxes.
- D. Orient boxes to accommodate wiring devices.
- E. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- F. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- G. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- H. Install stamped steel bridges to fasten flush mounting outlet box between studs.
- I. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- J. Install adjustable steel channel fasteners for hung ceiling outlet box.
- K. Do not fasten boxes to ceiling support wires or other piping systems.
- L. Support boxes independently of conduit.
- M. Install gang box where more than one device is mounted together. Do not use sectional box.

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- N. Install gang box with plaster ring for single device outlets.

3.09 INSTALLATION CONCRETE PULLBOXES AND VAULTS

- A. Install boxes flush with finished grade or surface material.
- B. Install hold down bolts for all covers.
- C. Ground bond steel cover plate with insulated green grounding conductor.
- D. Grout between box and extension(s).
- E. Any box installed in areas of vehicular traffic shall be H20 rated. Contractor shall verify this requirement prior to ordering.

3.10 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.
- C. Locate outlet boxes to allow luminaires positioned as indicated on reflected ceiling plan.
- D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- E. ADJUSTING
- F. Adjust flush-mounting outlets to make front flush with finished wall material.
- G. Install knockout closures in unused openings in boxes.

3.11 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

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SECTION 26 15 46 – EXTERIOR LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the exterior lighting system for this project
- B. Work Included
 - 1. Furnish and install a fully functional exterior lighting system including all fixtures, wiring and controls and other material as shown on in the Electrical Drawings and specified herein. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that any power supplies, modules, controls, programming or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
 - 2. Site and System Investigation: The bidding contractor for the exterior lighting system shall visit the site prior to the bid and become thoroughly knowledgeable about how to integrate the new lights with the existing exterior lighting control system on site. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.
- C. Section Includes:
 - 1. This section describes the requirements for the building exterior lighting system for this project.

1.02 REFERENCES AND STANDARDS

- A. California Electrical Code (CEC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Energy Code (CENC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. Underwriters Laboratories, Inc. (UL):
 - 1. UL 66 - Fixture Wire
 - 2. UL 844 - Electric Lighting Fixtures for Use in Hazardous Locations
 - 3. UL 924 - Emergency Lighting and Power Equipment
 - 4. UL 1598 - Luminaires
 - 5. UL 2108 - Low Voltage Lighting Systems
- D. California Illumination Engineering Society of North America (IESNA):
 - 1. IESNA LM-79-2008 - Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products.

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2. IESNA LM-80-2008 - Approved Method for Measuring Lumen Maintenance of LED Light Sources.

- E. Restriction of Hazardous Substances in LED (RoHS):
 1. EU RoHS; Directive 2002/95/EC Restriction of Hazardous Materials.

1.03 SUBMITTALS

- A. Product Data
 1. Light fixtures
 2. Fixture transformers (as required)
 3. Lighting controls

1.04 WARRANTY

- A. Units and components offered under this section shall be covered by a 1-year parts and labor warranty for malfunctions resulting from defects in material and workmanship. Warranty shall begin upon acceptance by Owner.

PART 2 - PRODUCTS

2.01 LIGHT FIXTURES

- A. See Lighting Schedule in Electrical Drawings
- B. Fixture O1
 1. Surface mounted wall luminaire
 2. Basis of Design: WE-EF Lighting USA PLS430
 3. Coordinate finish/color with Architect
 4. See plans for locations, quantities, and controls

2.02 LIGHT EMITTING DIODES (LED)

- A. Refer to the Fixture Schedule for size and type of LED lamps required.
- B. All diodes shall come from the same manufacturer and carry the same bin number.
- C. All diodes shall be tested and tuned for the optimal Kelvin color point.
- D. Correlated color temperature: 4000K
- E. Minimum CRI (Color Rendering Index): 70
- F. Diodes shall have a minimum life of 50,000 hours and maintain at least 70% of initial lumens throughout this period.

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- G. LED fixture components shall be free of all toxic materials to include lead, cadmium and mercury, and shall be RoHS compliant.
- H. Groups of three or more diodes in a single housing shall be tested for even distribution.
- I. All LED fixtures shall have an IES formatted electronic photometric report.
- J. Comply with IES LM-79-08 Approved Method for measuring lumen maintenance of LED light sources.
- K. Comply with IES LM-80-08 Approved Method for electrical and photometric measurement of SSL product.
- L. LED arrays shall be sealed, high-performance, long life type; minimum 70% rated output at 50,000 hours.
- M. LEDs shall be "Bin No. 1" quality.
- N. The LED light source shall be fully dimmable with use of compatible dimmers switch designated for low voltage loads.
- O. All fixtures installed outdoors and adequately protected from weather (i.e. under a canopy, etc.) shall be listed and approved for damp locations.
- P. All fixtures installed outdoors and exposed to weather shall be listed and approved for wet locations.

2.03 LED DRIVERS

- A. LED drivers shall be integral to fixture housing or remotely located, when specified, within 15 feet of diode assembly.
- B. Drivers shall have a minimum life of 50,000 hours and maintain at least 70% of initial lumens for that period.
- C. Typical LED drivers shall be electronic, 0-10V dimming.
- D. Drivers shall be solid state and accept 120 through 277 VAC at 60 Hz input.
- E. Power Factor: 0.90 or higher.
- F. Maximum driver case temperature not to exceed driver manufacturer recommended operational parameters.
- G. Output operating frequency: 60Hz.
- H. Interference: EMI and RFI compliant with FCC 47 CFR Part 15.

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- I. Total Harmonic Distortion Rating: 20% Maximum.
- J. Meet electrical and thermal conditions as described in LM-80 Section 5.0. 7.

2.04 CONTROLS

- A. The contractor shall provide and install all required controls as indicated in the Electrical Drawings and as required by CA Energy Code.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine project site conditions for acceptance of lighting fixture installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

- A. Architectural Plans shall govern exact ceiling construction and mounting conditions for all fixtures. Contractor shall be responsible for coordination of fixture mounting and compatibility with ceiling construction.
- B. Light fixtures in areas where exposed or concealed pipe and ductwork prevents direct access to the structural ceiling, shall be provided with appropriate support system to suspend fixture below obstructions to avoid conflicts with same.
- C. All exposed conduit shall be routed and installed in such a manner as to reduce the visibility of the conduit and keep the layout simple and compact.
- D. Coordinate all conduit pathways with the block wall installation.

3.03 INSTALLATION

- A. Install lighting fixtures in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Contractor shall be responsible for all supports, hangers, and hardware necessary for a complete installation.
- C. Light fixtures shall be plumb, level, square, in straight lines and without distortion. Remedy light leaks that may develop after installation of recessed or enclosed fixtures.

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3.04 FIXTURE SUPPORTS

A. Physical supports

1. Surface mount all overhead fixtures directly to the underside of metal roof deck
2. Provide recessed metal boxes for all wall mounted fixtures, coordinate locations and rough in with concrete masonry wall construction. Secure wall mounted fixtures to the provided metal box anchored within the CMU wall
3. Support surface mounted fixtures more than 18" wide at or near each corner or edge, in addition to support from outlet box.
4. Where ceiling and/or wall construction or pipe and/or ductwork is such that mounting channels, strong-backs, trapezes, brackets, etc., are required to properly support fixtures, provide these supports under this Section, unless otherwise indicated.
5. Provide all boxes with grounding pigtail.
6. On concrete ceilings, use one of the following for supporting fixtures other than by outlet box:
 - a. Preset concrete inserts, provided inserts are completely covered by the fixture canopy.
 - b. 1/4" by appropriate length wedge type anchor.

B. Seismic supports

1. All light fixtures shall be surfaced mounted to either the underside of the metal roof deck or wall mounted to the CMU wall.

3.05 IDENTIFICATION SYSTEM

- A. All junction box cover plates for the lighting branch circuit system shall be clearly marked with a permanent black ink felt pen identifying the branch circuit (both panel designation and circuit number) contained in the box.

3.06 FIELD QUALITY CONTROL

A. Visual and mechanical inspection

1. Inspect for physical damage, defects, alignment and fit
2. Perform operational test of each light fixture after installed, circuited, and energized
3. Perform emergency operational test of all lighting fixtures connected to emergency circuiting by interrupting normal power source

- B. Contractor shall replace at no cost to the Owner all equipment which is found defective or do not operate within factory specified tolerances.

3.07 ADJUSTING

- A. Field aiming: Where any adjustable light fixture is specified, the Contractor shall allow time in the bid and be responsible upon the installation of the light fixtures, for aiming as described in the fixture schedule. This aiming will occur at night under the direction

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of the Owner. The Contractor shall be responsible for providing the labor and materials for field aiming. This shall include, but not limited to, special rigging or scaffolding, adjusting fixtures in field, and testing of various lenses or louvers with fixtures, as directed by the Owner.

3.08 CLEANING

- A. Clean lighting fixtures prior to Project closeout in accordance with Manufacturer's recommended materials and methods.

3.09 ACCEPTANCE TESTING

- A. The Contractor shall conduct the required Acceptance Testing per CENC for the lighting fixtures and associated controls. See spec section 26 01 00 for more details

END OF SECTION

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SECTION 26 27 16 – CABINETS AND ENCLOSURES

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the cabinets and enclosures for this project.

1.02 REFERENCES

- A. National Electrical Manufacturer's Association (NEMA):
 - 1. NEMA 250; Enclosures for Electrical Equipment.
 - 2. NEMA ICS 1; Industrial Control and Systems.
 - 3. NEMA ICS 4; Terminal Blocks and Industrial use.
 - 4. NEMA ICS 6; Enclosures for Industrial Controls and Systems.
- B. Underwriters Laboratories (UL):
 - 1. UL 50; Enclosures for Electrical Equipment.
 - 2. UL 65; Standards for Wired Cabinets.
 - 3. UL 1059; Terminal Blocks.
 - 4. UL 1773; Termination Boxes.

1.03 SUBMITTALS

- A. Product Data
- B. Manufacturer's Instructions

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 CABINETS AND ENCLOSURES

- A. Description: Interior Locations: NEMA 1. Exterior locations: NEMA 3R

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- B. Construction: Shall be code gauge galvanized steel with standard concentric knockouts for conduit terminations. Size shall be as indicated on Drawings.
- C. Finish: Manufacturer's standard gray baked enamel finish.
- D. Covers: Continuous hinged steel door, lockable and keyed to match panelboard locks. Provide padlock hasp at exterior locations.
- E. Mounting:
 - 1. Surface cabinets shall be furnished with screw cover trim, flush hinged door and shall not be less than 6 inches deep.

2.02 TERMINAL BLOCKS AND ACCESSORIES

- A. Terminal blocks: NEMA ICS 4; UL listed.
- B. Power terminals: Unit construction type, closed-back with tubular pressure screw connections, rated 600 volts.
- C. Identification: Identify terminal strips with permanent numbers.
- D. Wiring diagram: Provide wiring diagram in protective pocket on inside front cover of cabinet. Diagram shall indicate control wiring, connections, and layout of components within enclosure.

2.03 HINGED COVER ENCLOSURES

- A. Description: NEMA 250, Type 1 (Interior) and 3R (Exterior) steel enclosure
 - 1. Covers: Continuous hinge, held closed by flush latch operable by key.
 - 2. Furnish interior plywood panel for mounting terminal blocks and electrical components; finish with white enamel.
 - 3. Enclosure Finish: Manufacturer's standard enamel.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of cabinets and enclosures installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

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3.02 INSTALLATION

- A. Set cabinets and enclosures plumb and symmetrical with building lines. Furnish and install all construction channel bolts, angles, etc. required to mount all equipment furnished under this Section of the Specifications.
- B. Cabinets and enclosures shall be anchored and braced to withstand seismic forces calculated in accordance with that referenced in Section 26 0100: Basic Electrical Requirement.
- C. "Train" interior wiring, bundle and clamp using specified plastic wire wraps.
- D. Install interior cabinets with top of enclosure 6'6" above finished floor.
- E. Install exterior cabinets with top of enclosure 6'6" above finished grade.
- F. Replace doors or trim exhibiting dents, bends, warps or poor fit that may impede ready access, security or integrity.
- G. Terminate conduit in cabinet with lock nut and grounding bushing.
- H. Terminate wiring on terminal blocks and identify each with heat shrink tags.

3.03 CLEANING

- A. Touch up scratched or marred surfaces to match original finish.
- B. Clean electrical parts to remove conductive and harmful materials.
- C. Remove dirt and debris from enclosure.
- D. Clean existing panelboards and load centers to remain or to be reinstalled.

END OF SECTION

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SECTION 26 28 00 – CIRCUIT PROTECTIVE DEVICES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. This section describes the requirements for the circuit protective devices for this project.

1.02 REFERENCES

- A. Federal Specification (FS):
 - 1. FS W-C-375; Circuit Breakers, Molded Case, Branch Circuit and Service.
 - 2. FS W-F-870; Fuseholders (for Plug and Enclosed Cartridge Fuses).
- B. Underwriters Laboratories, Inc. (UL):
 - 1. UL 248(1-16); Low-Voltage Fuses.
 - 2. UL 489; Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
 - 3. UL 512; Fuseholders.
 - 4. UL 1066; Low Voltage AC and DC Power Circuit Breakers Used in Enclosures.
- C. National Electrical Manufacturer Association (NEMA):
 - 1. NEMA AB 1; Molded Case Circuit Breakers.

1.03 SUBMITTALS

- A. Product Data
- B. Operation and Maintenance (O&M) Manuals

1.04 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Overcurrent Protective Device components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by

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rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.

- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

PART 2 - PRODUCTS

2.01 FUSES

- A. General: All power fuses shall be time-delay, high interrupting (300 K AIC), current limiting type, unless otherwise noted on the Drawings. All fuses shall be the product of a single Manufacturer and shall be selectively coordinated when applied in 2:1 ratios. Types of fuses shall be as follows:
 - 1. 0 - 600 amperes: UL Class J, dual element, time delay type fuse with separate overload and short-circuit elements. The fuse shall hold 500% of rated current for a minimum of 10 seconds.
 - 2. 601 - 4000 amperes: UL Class L, time delay type fuses with 99.9% pure silver fuse links and "O-rings" to seal between the end bells and the fuse barrel. Fuses shall hold 500% of rated current for a minimum of 4 seconds, clear 20 times rated current in 0.01 seconds or less.
 - 3. Motor branch circuit fuses (0-600 amperes): UL Class J dual element, time delay type fuse. Motor branch circuit fuses shall be sized for Type 2 coordination for the motor controller and back-up motor overload protection and shall be coordinated with motor starter overload relay heaters.
- B. Control and instrument fuses shall be suitable for installing in blocks or fuse holders. Exact type and rating shall be as recommended by the Manufacturer of the equipment being protected.
- C. Fuses for installation in current limiting circuit breakers or motor circuit protectors shall meet the specific requirements of the Manufacturers of that equipment to ensure compatibility.

2.02 MOLDED CASE CIRCUIT BREAKERS

- A. Unless noted otherwise, circuit breakers shall be molded case, bolt on and trip indicating.

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- B. Where stationary molded case circuit breakers are indicated on the Drawings to be current limiting type, they shall be current limiting as defined by UL 489 and shall not employ any fusible elements.
- C. Circuit breakers shall have interrupting capacity not less than that indicated on the Drawings or if not indicated, not less than 25,000 RMS symmetrical amps for 480 volt systems and 10,000 RMS symmetrical amps for 208 volt systems.
- D. Covers shall be sealed on non-interchangeable breakers and trip unit covers shall be sealed on interchangeable trip breakers to prevent tampering. Circuit breaker ratings shall be clearly visible after installation or engraved nameplates shall be provided stating the rating. All ferrous parts shall be plated to minimize corrosion.
- E. Circuit breakers shall be toggle, quick-make and quick-break operating mechanisms with trip-free feature to prevent contacts being held closed against overcurrent conditions in the circuit. Trip position of the breakers shall be clearly indicated by operating handles moving to a center position.
- F. Multipole breakers shall have a single handle to open and close all contacts simultaneously in both manual operation and under automatic tripping. Interpole barriers shall be provided inside the breaker to prevent any phase-to-phase flashover. Each pole of the breaker shall have means for Arc extinguishing.
- G. All terminals shall be rated for aluminum or copper wire.
- H. Unless noted otherwise, circuit breakers with trip ratings 400 amp and smaller shall be ambient temperature compensated, thermal magnetic type unless otherwise noted. Breakers shall be of full size, 1" per pole type. Panels with more than one branch breaker larger than 100 amps shall be installed in distribution type panels.
- I. Accessories: Provide accessories as noted on the Drawings, i.e. shunt-trip, auxiliary contacts, undervoltage trip, alarm switch, etc.
- J. Spaces in the boards shall be able to accept any combination of 1, 2 or 3 pole circuit breakers as indicated. Provide all necessary bus, device supports and mounting hardware sized for frame, not trip rating.
- K. Series rated breakers are not acceptable unless specifically noted on the Drawings.
- L. Provide lockable breakers for equipment disconnects as indicated on the Drawings.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of cabinets and enclosures installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

- A. Install overcurrent protective devices in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Tighten electrical connectors and terminals; including screws and bolts, in accordance with equipment Manufacturers published torque-tightening values for equipment connectors. Where Manufacturers torque requirements are not indicated tighten connectors and terminals to comply with tightening torque specified in UL Standard 486A.
- C. Install overcurrent protective devices and accessories in accordance with Manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. All devices shall be installed in accordance with applicable CEC and NEMA standards for installation.
- D. Circuit breakers serving "Fire Alarm Control Panel(s)" shall be red in color.

3.03 FIELD QUALITY CONTROL

- A. The Contractor shall supply a suitable and stable source of electrical power to each test site.
- B. Testing of overcurrent protective devices shall be done only after all devices are installed and system is energized.
- C. Prefunctional testing:
 - 1. Visual and mechanical inspection:
 - a. Inspect for physical damage, defects alignment and fit.
 - b. Perform mechanical operational tests in accordance with Manufacturer's instructions.
 - c. Compare nameplate information and connections to Contract Documents.
 - d. Check tightness of all control and power connections.
 - e. Check that all covers, barriers and doors are secure.
 - 2. Electrical tests:
 - a. Circuit continuity: All feeders shall be tested for continuity. All neutrals shall be tested for improper grounds.

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- b. Determine that circuit breaker will trip under overcurrent condition, with tripping time in conformance with NEMA AB 1 requirements.
 - c. Test all circuit breakers with frame size 225 amps and larger and 10 percent of all circuit breakers with frame sizes less than 225 amps in each panelboard, distribution board, switchboard, etc. unless otherwise noted.
- D. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.
- E. Contractor shall submit the final test report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies and remedies. Test report shall be included in the operation and maintenance manuals.

3.04 ADJUSTING

- A. Adjust circuit breaker trip settings for coordination with other overcurrent protective devices in system.
- B. Adjust circuit breaker trip settings for adequate protection from overcurrent and fault currents.

3.05 CLEANING

- A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean overcurrent protective devices per Manufacturer's approved methods and materials. Remove paint splatters and other spots, dirt and debris.

END OF SECTION

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SECTION 26 51 00 – INTERIOR LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the interior lighting system for this project
- B. Work Included
 - 1. Furnish and install a fully functional interior lighting system including all fixtures, wiring and controls and other material as shown on in the Electrical Drawings and specified herein. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that any power supplies, modules, controls, programming or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.

1.02 REFERENCES AND STANDARDS

- A. California Electrical Code (CEC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Energy Code (CENC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. Underwriters Laboratories, Inc. (UL):
 - 1. UL 66 - Fixture Wire
 - 2. UL 844 - Electric Lighting Fixtures for Use in Hazardous Locations
 - 3. UL 924 - Emergency Lighting and Power Equipment
 - 4. UL 1598 - Luminaires
 - 5. UL 2108 - Low Voltage Lighting Systems
- D. California Illumination Engineering Society of North America (IESNA):
 - 1. IESNA LM-79-2008 - Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products.
 - 2. IESNA LM-80-2008 - Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- E. Restriction of Hazardous Substances in LED (RoHS):
 - 1. EU RoHS; Directive 2002/95/EC Restriction of Hazardous Materials.

1.03 SUBMITTALS

- A. Product Data
 - 1. Light fixtures

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2. Fixture transformers
3. Emergency battery packs
4. Lighting Controls

PART 2 - PRODUCTS

2.01 LIGHT FIXTURES

- A. See Lighting Schedule in Electrical Drawings

2.02 LIGHT EMITTING DIODES (LED)

- A. Refer to the Fixture Schedule for size and type of LED lamps required.
- B. All diodes shall come from the same manufacturer and carry the same bin number.
- C. All diodes shall be tested and tuned for the optimal Kelvin color point.
- D. Correlated color temperature: 4000K
- E. Minimum CRI (Color Rendering Index): 80 or 90 as specified on Electrical Drawings
- F. Diodes shall have a minimum life of 50,000 hours and maintain at least 70% of initial lumens throughout this period.
- G. LED fixture components shall be free of all toxic materials to include lead, cadmium and mercury, and shall be RoHS compliant.
- H. Groups of three or more diodes in a single housing shall be tested for even distribution.
- I. All LED fixtures shall have an IES formatted electronic photometric report.
- J. Comply with IES LM-79-08 Approved Method for measuring lumen maintenance of LED light sources.
- K. Comply with IES LM-80-08 Approved Method for electrical and photometric measurement of SSL product.
- L. LED arrays shall be sealed, high-performance, long life type; minimum 70% rated output at 50,000 hours.
- M. LEDs shall be "Bin No. 1" quality.
- N. The LED light source shall be fully dimmable with use of compatible dimmers switch designated for low voltage loads.

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2.03 LED DRIVERS

- A. LED drivers shall be integral to fixture housing or remotely located, when specified, within 15 feet of diode assembly.
- B. Drivers shall have a minimum life of 50,000 hours and maintain at least 70% of initial lumens for that period.
- C. Typical LED drivers shall be electronic, 0-10V dimming.
- D. Drivers shall be solid state and accept 120 through 277 VAC at 60 Hz input.
- E. Power Factor: 0.90 or higher.
- F. Maximum driver case temperature not to exceed driver manufacturer recommended operational parameters.
- G. Output operating frequency: 60Hz.
- H. Interference: EMI and RFI compliant with FCC 47 CFR Part 15.
- I. Total Harmonic Distortion Rating: 20% Maximum.
- J. Meet electrical and thermal conditions as described in LM-80 Section 5.0. 7.

2.04 FIXTURE TRANSFORMERS

- A. Low voltage transformers
 - 1. Low voltage transformers shall be core and coil construction, unless otherwise noted.
 - 2. Primary voltage shall be as noted in Fixture Schedule, secondary voltage 12 VAC, unless otherwise noted.
 - 3. Where transformers are integral to the fixture, they shall be accessible from below.
 - 4. Sound rating shall be the lowest available. Replace excessively noisy transformers at no cost to the Owner:

2.05 EMERGENCY BATTERY PACKS

- A. Internal type: Self-contained, modular, battery inverter unit factory mounted within the fixture body.
 - 1. Test switch and LED indicator light: Visible and accessible without entering ceiling space.
 - 2. Battery: Sealed, maintenance-free, nickel-cadmium type, with a minimum nominal 10-year life.
 - 3. Charger: Fully automatic, solid state, constant-current type.
 - 4. The product shall meet the U.L. Standard #924 "Emergency Lighting Equipment".

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine project site conditions for acceptance of lighting fixture installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

- A. Architectural Plans shall govern exact ceiling construction and mounting conditions for all fixtures. Contractor shall be responsible for coordination of fixture mounting and compatibility with ceiling construction.
- B. Light fixtures in areas where exposed or concealed pipe and ductwork prevents direct access to the structural ceiling, shall be provided with appropriate support system to suspend fixture below obstructions to avoid conflicts with same.

3.03 INSTALLATION

- A. Install lighting fixtures in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Contractor shall be responsible for all supports, hangers, and hardware necessary for a complete installation.
- C. Light fixtures shall be plumb, level, square, in straight lines and without distortion. Remedy light leaks that may develop after installation of recessed or enclosed fixtures.

3.04 FIXTURE SUPPORTS

- A. Physical supports
 1. Recessed fixtures in framed ceilings shall be supported by joist hangers fastened to adjacent ceiling joists.
 2. Recessed downlights in framed ceilings shall be supported with Manufacturer-supplied bar hangers and shall be installed according to the Manufacturer's instructions.
 3. Surface mounted fixtures solely supported by recessed boxes in a gypsum board ceiling shall have a 1-1/8" steel bar screwed or welded to the back of the box. This steel bar must be long enough to span two ceiling support channels and shall be attached to the channels by twisting wire around the bar and the support channel. For fixtures weighing over 50 pounds, provide fixture studs in recessed box.
 4. Support surface mounted fixtures more than 18" wide at or near each corner or edge, in addition to support from outlet box.

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5. Twisting wire around the bracket and two adjacent ceiling support channel runners on either side of fixture shall support recessed downlights manufactured with built-in brackets.
6. Where ceiling and/or wall construction or pipe and/or ductwork is such that mounting channels, strong-backs, trapezes, brackets, etc., are required to properly support fixtures, provide these supports under this Section, unless otherwise indicated.
7. Provide all boxes with grounding pigtail.
8. On concrete ceilings, use one of the following for supporting fixtures other than by outlet box:
 - a. Preset concrete inserts, provided inserts are completely covered by the fixture canopy.
 - b. 1/4" by appropriate length wedge type anchor.

B. Seismic supports

1. Recessed fixtures in suspended ceilings shall be supported by connecting two fixture support wires to the fixture at diagonal opposite corners for fixtures weighing 56 pounds or less. Connect four wires, one at each corner for fixtures weighing more than 56 pounds.
2. Surface mounted fixtures on suspended ceilings shall be attached to the main ceiling runner with at least two positive clamping devices and shall have a fixture support wire attached to each clamping device and to the structure above.
3. Recessed downlight fixtures in suspended ceilings shall be supported by connecting one fixture support wire to the fixture housing.
4. All suspended fixtures shall be able to swing 45 degrees from vertical in any direction without obstruction. Furnish suspended fixtures with universal joint type hanger canopy and longitudinal sway adapter at each stem, to permit 45-degree swivel on 360-degree circle at canopy and 45-degree longitudinal movement at sway adapter. Submit Drawings of hanger assembly for review prior to ordering. If suspended fixture is not free to swing 45 degrees in any direction, without obstructions, provide fixture seismic restraint to prevent contact in conform to DSA IR 16-9.
5. Unless fixtures are cable hung, Contractor shall provide for all suspended fixtures a safety wire or cable attached to the fixture and structure at each support capable of supporting four times the supported load.
6. All recessed fixtures shall be furnished with earthquake clips where installed in tee bar ceiling.

3.05 IDENTIFICATION SYSTEM

- A. All junction box cover plates for the lighting branch circuit system shall be clearly marked with a permanent black ink felt pen identifying the branch circuit (both panel designation and circuit number) contained in the box.

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3.06 FIELD QUALITY CONTROL

- A. Visual and mechanical inspection
 - 1. Inspect for physical damage, defects, alignment and fit
 - 2. Perform operational test of each light fixture after installed, circuited, and energized
 - 3. Perform emergency operational test of all lighting fixtures connected to emergency circuiting by interrupting normal power source
- B. Contractor shall replace at no cost to the Owner all equipment which is found defective or do not operate within factory specified tolerances.

3.07 ADJUSTING

- A. Field aiming: Where any adjustable light fixture is specified, the Contractor shall allow time in the bid and be responsible upon the installation of the light fixtures, for aiming as described in the fixture schedule. This aiming will occur at night under the direction of the Owner. The Contractor shall be responsible for providing the labor and materials for field aiming. This shall include, but not limited to, special rigging or scaffolding, adjusting fixtures in field, and testing of various lenses or louvers with fixtures, as directed by the Owner.

3.08 CLEANING

- A. Clean lighting fixtures prior to Project closeout in accordance with Manufacturer's recommended materials and methods.

3.09 ACCEPTANCE TESTING

- A. The Contractor shall conduct the required Acceptance Testing per CENC for the lighting fixtures and associated controls. See spec section 26 01 00 for more details

END OF SECTION

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SECTION 26 61 16 – FIRE ALARM

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the fire alarm system on this project
- B. Work Included
 - 1. Furnish and install extensions to the existing fire alarm system including all wiring and connections and other material as shown on in the Electrical Drawings and specified herein. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that any power supplies, relays, resistors, cards, modules, programming or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
 - 2. Site and System Investigation: The bidding contractor for the fire alarm system shall visit the site prior to the bid and become thoroughly knowledgeable about the existing system and work required to perform work of this section. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.

1.02 REFERENCES AND STANDARDS

- A. California Fire Code (CFC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. American National Standards Institute, Inc. (ANSI): ANSI C62.41
- C. National Fire Protection Association (NFPA): 72, 101
- D. Underwriter Laboratories, Inc. (UL)
 - 1. UL 38; Manual Signaling Boxes Fire Alarm Systems.
 - 2. UL 268; Smoke Detectors for Fire Alarm Signaling Systems.
 - 3. UL 268 A; Smoke Detectors for Duct Application.
 - 4. UL 464; Audible Signal Appliances.
 - 5. UL 497B; Protectors for Data Communications and Fire Alarm Circuits.
 - 6. UL 521; Heat Detectors for Fire Protective Signaling Systems.
 - 7. UL 864; Control Units and Accessories for Fire Alarm Systems.
 - 8. UL 1424; Cables for Power-Limited Fire-Alarm Circuits.
 - 9. UL 1480; Speakers for Fire Alarm, Emergency and Commercial and Professional Use.
 - 10. UL 1481; Power Supplies for Fire-Protective Signaling Systems.
 - 11. UL 1638 Visual Signaling Appliances Standard.
 - 12. UL 1711; Amplifiers for Fire Protective Signaling Systems.

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13. UL 1971 Signal Devices for Hearing Impaired.

E. International Engineering Consortium (IEC): IEC 60849

F. Factory Mutual System (FM) approval guide: FM P7825

G. California State Fire Marshal (CSFM)

1.03 SUBMITTALS

A. Product Data

B. Shop Drawings

C. Operation and Maintenance (O&M) Manuals

D. As-Built Drawings

E. Field Test Reports

1.04 QUALITY ASSURANCE

A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.

B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.

C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to standards listed in Section 26 01 00.

D. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

E. Only products and applications listed in this Section and in the Electrical Drawings may be used on the Project unless otherwise submitted.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products furnished by the Manufacturers indicated in the Electrical Drawings and this section shall be acceptable if in compliance with all features specified herein
 - 1. Gamewell-FCI
 - 2. System Sensor

2.02 DEVICES

- A. Initiation: See Component Schedule in the Electrical Drawings
- B. Notification: See Component Schedule in the Electrical Drawings

2.03 CONDUIT

- A. Conduit shall be in accordance with the California Electrical Code (CEC).
- B. Where required, all wiring shall be installed in conduit. Conduit fill shall not exceed 40 percent of interior cross-sectional area where three or more cables are contained within a single conduit.
- C. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per CEC Article 760-29.
- D. Wiring for 24-volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
- E. Conduit shall not enter the fire alarm control panel or any other remotely mounted control panel equipment or back boxes, except where conduit entry is specified by the Fire Alarm Control Panel (FACP) manufacturer.
- F. Connectors shall be compression type fittings to join EMT to a box or enclosure and to couple two ends of EMT conduit. Fittings shall be: Zinc plated, steel UL listed concrete tight, and threadless where connecting to conduit. Male hub threads -NPSM (American National Standard Pipe Straight Mechanical) where connecting to box or cabinet with steel locknuts.

2.04 WIRE

- A. See wiring/cable schedule in the Electrical Drawings

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- B. Wiring shall be in accordance with state and national codes (e.g., CEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
- C. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
- D. Wire and cable shall be installed in conduit or metal surface raceway when in exposed spaces. Minimum size of conduit shall be 3/4" inch. Utilize Wiremold 700 series surface raceway (in lieu of conduit) for area where conduit cannot be installed concealed. Cable above accessible ceiling can be installed free air when using applicable cable. Support all free air cable every 48" with j-hooks.
- E. All field wiring (with exception of external communications Ethernet) shall be electrically supervised for open circuit and ground fault.
- F. The FACP shall be capable of T-tapping NFPA Style 4 (Class B) Signaling Line Circuits (SLCs). Systems which do not allow or have restrictions in, for example, the number of T-taps, length of T-taps etc., is not acceptable.

2.05 EQUIPMENT & BOXES

- A. See Component Schedule in the Electrical Drawings
- B. Control panels and remote power supplies shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. FACP primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold water pipe or grounding rod. The control panel enclosure shall feature a quick removal chassis to facilitate rapid replacement of the FACP electronics.
- C. Terminal Boxes, Junction Boxes and Cabinets: All boxes and cabinets shall be UL listed for their use and purpose.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of cabinets and enclosures installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

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3.02 INSTALLATION

A. Wiring:

1. Individual input and output device addressability as well as remote sensitivity measurement, supervision and power shall all be performed on the same pair of wires. Wiring shall be Class B.
2. Each Class B initiating circuit shall consist of a two (2)-wire circuit. allowing a maximum of 20 T-taps and not requiring any end-of-line device for supervision. Each initiating circuit shall accommodate up to 75% of the manufacturers maximum addressable programmable initiating devices, to allow for future expansion.
3. Wiring for shielding certain conductors from others or routing in separate raceways, shall be as recommended by the Manufacturer's current requirements.
4. All wiring shall be installed in a continuous steel conduit or metal surface raceway when in exposed spaces. All conduit fittings shall be steel compression. Conduit shall be of the size recommended by the equipment Supplier with a minimum of 3/4" inch.
5. Wire color-coding shall remain the same throughout the system.
6. No wiring other than that directly associated with life safety/fire alarm detection, alarms, or auxiliary fire protection functions (no 120 VAC), shall be permitted in life safety/fire alarm conduits.
7. Make conduit and wiring connections to sprinkler flow switches, PIV's, sprinkler valve monitors, door hold-open/closure devices, smoke management fans, smoke dampers, elevator controller, emergency generator, etc.
8. All wiring shall be checked and tested to ensure that there are no grounds, opens or shorts.
9. All life safety/fire alarm junction boxes shall be color-coded and marked
10. Wire nut splices are not allowed.
11. Wires shall be numbered at each connection, termination, and junction point. Wire numbering tags shall be Brady Perma-Code, Westline or equal wire markers. Each group of wires shall be tagged with its destination at each panel, terminal box or junction box.
12. All wire used on the life safety/fire alarm and communication system shall have a minimum insulation rating of 105 degrees C. Bell wire or thermostat wire is not acceptable.

3.03 FIELD QUALITY CONTROL

A. Pre-functional testing: Visual and mechanical inspection

1. Inspect for physical damage, defects alignment and fit.
2. Compare nameplate information and connections to Contract Documents.
3. Check tightness of all conduit and wire connections.
4. Check that all covers, barriers and doors are secure.

B. Pre-functional testing: Electrical tests

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1. The system shall be completely tested prior to final acceptance testing. All points shall be tested from point of initiation to the final point or points of annunciation. All circuits shall be tested for continuity and ability to transmit the required signal correctly to the FACP. Any problem due to wrong wire type, wire twist, impedance, mismatches, noise filtering or shielding shall be completely corrected during pretesting and prior to any final acceptance tests.
 2. Testing shall include each and every device in the system. Coordinate with other trades as necessary for testing.
 3. Tamper switches: Verify "trouble" signal is received and alarmed on closing of each valve.
 4. Smoke detectors and duct smoke detectors: Test with actual or approved artificial smoke. Verify that reset does not occur when devices are cleared of smoke. Verify supervisory circuit function. Perform pressure differential test on all duct-mounted smoke detectors.
 5. Intelligibility testing shall be per IEC 60849 and verified and tested by a third-party testing organization.
 6. Central station notification: Verify that one set of conductors in the terminal cabinet becomes a short circuit on any "trouble" condition and that the other set becomes a short circuit on any "alarm" condition. Verify that the conductor groups are labeled properly.
- C. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.

3.04 TESTING

- A. One-half to three-quarters of the way through project, District Facilities will set up a meeting (preferably at the school site) with decision makers from Facilities, Police Services, Maintenance, Maintenance Alarm Tech, General Contractor, Alarm Sub-contractor, and School Administrator to review the alarm protocol and to identify responsible personnel and timelines for the items listed in paragraph D, which follows.
- B. After all equipment specified herein has been installed and is in operating condition, performance tests shall be conducted by Contractor in accordance with, but not limited to, Table 14.3.1 & 14.4.3.2, NFPA 72 to verify that installation and components comply with these specifications. Contractor shall furnish competent personnel for these tests. Testing shall be scheduled with the Owner and shall occur after receipt by Architect of Contractor's written certification of completion, record one-line diagram, wiring diagrams, maintenance and operation manuals, and other "As-Built" data required by these specifications.
- C. Upon completion of the installation of the fire protective signaling equipment and after satisfactory performance tests have been conducted, a satisfactory demonstration of the entire system shall be made in the presence of the Project Inspector. Contractor shall coordinate with Project Inspector and School. Demonstration shall be completed prior to occupancy by School and prior to final testing with the Owner.

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- D. After system is completely tested, the Contractor shall take the following actions with the Owner:
1. The Contractor will schedule a meeting with the Alarm Sub-contractors and Owner's Representatives to determine alarm zone and device nomenclature. The Contractor shall insure that the alarm zone and device nomenclature matches the actual building and room numbers used by the school. Architectural numbering shall not be used. Once confirmed, the Contractor shall demonstrate this to Owner's Representatives.

3.05 CERTIFICATION

- A. Written certification on the form found in NFPA 72 shall be submitted by the Contractor to the Project Inspector stating for the Contractor and the equipment manufacturer that component parts are as LISTED AND APPROVED BY the California State Fire Marshal, that the installation confirms in all respects to requirements as set forth in California Electrical Code, that acceptance testing has been performed in the presence of the Project Inspector. Contractor shall complete and sign form and submit to Project Inspector.

END OF SECTION

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SECTION 27 10 00 – DATA COMMUNICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the data communication system on this project.
- B. Work Included
 - 1. Furnish and install extensions to the existing data communication system including all wiring and connections and other material as shown on in the Electrical Drawings and specified herein. It is the intent that a complete operating system conforming to all applicable codes and District Standards be installed and that any power supplies, patch panels, modules, programming or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
 - 2. Site and System Investigation: The bidding contractor for the data communication system shall visit the site prior to the bid and become thoroughly knowledgeable about the existing system and work required to perform work of this section. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.

1.02 REFERENCES AND STANDARDS

- A. California Electrical Code (CEC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Fire Code (CFC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. Contractor shall ensure that, manufacturer, ANSI/TIA/EIA-586-B cable testing, and install of the telecommunications cabling network is per manufacturer's requirements and in accordance with NFPA-70 (National Electrical Code®), state codes, local codes, requirements of authorities having jurisdiction, and particularly the following standards:
- D. American National Standards Institute, Inc. (ANSI):
 - 1. ANSI/TIA/EIA-568-B.1 - Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements
 - 2. ANSI/TIA/EIA-568-B.2 - Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components
 - 3. ANSI/TIA/EIA-568-B.3 - Optical Fiber Cabling Components Standard
 - 4. ANSI/TIA/EIA-569-A - Commercial Building Standard for Telecommunications Pathways and Spaces

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5. ANSI/TIA/EIA-586-B - Cable Testing
 6. ANSI/TIA/EIA-606(A) - The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 7. ANSI/TIA/EIA-607(A) - Commercial Building Grounding and Bonding Requirements for Telecommunications
 8. ANSI/TIA/EIA 565.B.2,10 - Standard for Cat6
- E. International Electrotechnical Commission (IEC):
1. IEC 11801:2002 ed 2- International standard for Class F (Cat7)
 2. IEC 61076-3-104:2002- International standard for RJ quad jack
 3. IEC CD14165-114 - International standard for duplex gigabit on two pair Ethernet
- F. National Fire Protection Association (NFPA): 70
- G. Underwriter Laboratories, Inc. (UL)
- H. Cal/OSHA-Pocket Guide for the Construction Industry
- I. Contractor shall install cabling in accordance with the most recent edition of Building Industry Consulting Service International (BICSI) publications:
1. BICSI - Telecommunications Distribution Methods Manual (TDMM)
 2. BICSI - Cabling Installation Manual
 3. BICSI - Customer-Owned Outside Plant Design Manual
- J. Federal, state, and local codes, rules, regulations, and ordinances governing the work, are as fully part of the specifications as if herein repeated or hereto attached. If the contractor shall note items in the drawings or the specifications, construction of which would be code violations, promptly call them to the attention of the owner's representative in writing. Where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply.
- 1.03 SUBMITTALS
- A. Product Data
 - B. Operation and Maintenance (O&M) Manuals
 - C. Detail Visio 2007 As Built Drawings and Diagrams
 - D. Field Test Reports
- 1.04 QUALITY ASSURANCE
- A. Copper cabling will be Panduit with a 25 year Pan-Net warranty.
 1. At project completion, the contractor shall present to owner a single project binder with electronic and hard copies of test results, as built drawings, pictures,

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bill of materials listing part numbers, etc. and a Visio 2007 drawing electronic provided to owner's Information Services and Educational Technology (ISET) office which identifies all Data jack locations and port assigned numbers.

- B. The installing contractor shall furnish and install all hardware, cables, devices, and other materials even though not specifically mentioned herein, which are necessary for the proper integration of the system so that the system shall perform the functions listed herein in compliance with all specified requirements.
 - C. A Contractor may use up to ONE sub-contractor to install all CAT6 data cabling. Contractor will provide 'As Builts' and warranty information to the owner.
 - 1. The contract shall have a minimum of five years professional field experience pulling/terminating fiber and Cat6 cable.
 - 2. The contractor shall possess a valid C-7 California State contractor's license. This license shall have been issued two (2) years prior to the date of the bid. No other license classification is acceptable.
 - 3. The contractor and/or sub-contractors shall have Panduit Certified Installers as well as Corning Certified NPI Installers.
 - D. Pre-Installation Meeting:
 - 1. Schedule a meeting a minimum of five calendar days prior to beginning work.
 - 2. Agenda: Clarify questions related to work to be performed, scheduling, coordination, labeling for data jacks, data jack layout on telco racks in MDF and IDFs, etc.
 - 3. Attendance: Communications systems installer, general contractor, and other parties affected by work.
 - 4. A copy of manufacturer warranty application shall be provided at this meeting.
 - E. The contractor shall provide a twenty-five (25) year application performance warranty for all Panduit Pan-Net copper cable and connectivity products. The system shall be installed to meet all TIA/EIA commercial building wiring standards and installed per appropriate Panduit instruction sheets. If any Panduit product fails to perform as stated above, Panduit will provide new components at no charge.
- 1.05 WARRANTY
- A. The project shall be pre-registered with manufacturer before installation has begun.
 - B. The installation will have to pass scan tests by a certified contractor.
 - C. The installation will have to be documented with labels and drawings.
 - D. A 25-year PAN-NET manufacturer warranty covering all components, equipment and workmanship shall be passed through in writing with system documentation. The warranty period shall begin on the system's first use by the owner.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The acceptable manufacturers for the cabling connectivity is Panduit/General copper, Panduit/Panduit copper, and Corning Cable.
- B. Part listed are the owner's standards and any substitutions shall be approved in writing through submittal.
- C. Panduit 25 year Pan-Net
- D. Corning Cable

2.02 APPROVED PARTS LIST

- A. The follow is an approved parts list:

Wire Management

<u>Manufacturer</u>	<u>Part Number</u>	<u>Description</u>
Panduit		J-Hooks shall be Panduit
Panduit	WMP1E	2U Horizontal Wire management
Panduit	WMPSE	1U Horizontal Wire Management
Panduit	CLT100F-C3	1" Split Loom Tubing Orange
Panduit	CLT188F-X3	1.88" Split Loom Tubing Orange
		1" Fiber Innerduct
		2" Fiber Innerduct
Panduit	CWF400N	4" Conduit Waterfalls
Panduit	CCMKIT1	Cable Management Kit
Panduit	WMPVHC45E	Vertical Cable Manager Front & Rear
Panduit	NCMH2	2U Horizontal Cable Manager Front & Rear
Trilobular		Taptite II thread

Twisted Pair Products

<u>Manufacturer</u>	<u>Part Number</u>	<u>Description</u>
Panduit	PUR6004BU-U	Cat 6 Riser Blue
Panduit	PUR6004WH-U	Cat 6 Riser White
Panduit	PUR6004OR-U	Cat 6 Riser Orange
Panduit	PUR6004RD-U	Cat 6 Riser Red
Panduit	PUR6004YL-U	Cat 6 Riser Yellow
Panduit	PUR6004VL-U	Cat 6 Riser Violet
Panduit	PUP6004BU-U	Cat6 Plenum Blue
Panduit	PUP6004WH-U	Cat6 Plenum White
Panduit	PUP6004OR-U	Cat6 Plenum Orange
Panduit	PUP6004RD-U	Cat6 Plenum Red
Panduit	PUP6004YL-U	Cat6 Plenum Yellow

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Panduit	PUP6004VL-U	Cat6 Plenum Violet
General Cable	7136100	Outside Plant Cat 6
Panduit	CFPE1WHY	1 Port White Faceplate
Panduit	CFPE2WHY	2 Port White Faceplate
Panduit	CFPE4WHY	4 Port White Faceplate
Panduit	CFPE6WHY	6 Port White Faceplate
Panduit	CFP2SY	Stainless Steel 2 Port Faceplate
Panduit	CJ688TGWH	Cat 6 Jack White
Panduit	CJ688TGOR	Cat 6 Jack Orange
Panduit	CJ699TGYL	Cat 6 Jack Yellow
Panduit	CJ688TGBL	Cat 6 Jack Blue
Panduit	CJ688TGVL	Cat 6 Jack Violet
Panduit	CJ688TGRD	Cat 6 Jack Red
Panduit	CPPL24WBLV	Blank, Minicom, 24 port patch panel
Panduit	CPPL48WBLV	Blank, Minicom, 48 Port Patch Panel
Panduit	SRBWCY	Strain Relief for Patch Panel
Panduit	PSL-DCJB	Black out Module Red (Need White, Red Listed)
Panduit	PSL-DCJB-IW	Black out Module White
Panduit	PSL-DCJB	Black out Module
Panduit	C4PPLK	Replacement Label Kit
Panduit	UTPSP3RD	3 Foot Cat 6 Red Patch Cord
Panduit	UTPSP5RD	5 Foot Cat 6 Red Patch Cord
Panduit	UTPSP3OR	3 Foot Cat 6 Orange Patch Cord
Panduit	UTPSP6OR	5 Foot Cat 6 Orange Patch Cord

Raceway

<u>Manufacturer</u>	<u>Part Number</u>	<u>Description</u>
Panduit	LD3WH6-A	LD3 Raceway (Substitute 6 with 8 and 10, for Longer Lengths)
Panduit	LD5WH6-A	LD5 Raceway (Substitute 6 with 8 and 10, for Longer Lengths)
Panduit	LD10WH6-A	LD10 Raceway (Substitute 6 with 8 and 10, for Longer Lengths)
Panduit	CFXWH-E	Raceway Coupler (Replace 'X' with 3, 5, or 10 for the different size raceway)
Panduit	RAFXWH-E	Right Angle Fitting (Replace 'X' with 3, 5, or 10 for the different size raceway)
Panduit	ICFXWH-E	Inside Corner Fitting (Replace 'X' with 3, 5, or 10 for the different size raceway)
Panduit	OCFXWH-E	Outside Corner Fitting (Replace 'X' with 3, 5, or 10 for the different size raceway)

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Panduit	DCFXXH-E	Drop Ceiling Fitting (Replace 'X' with 3, 5, or 10 for the different size raceway)
Panduit	JBX3510WH-A	Single Gang Outlet for LD Raceway

Tools		
Manufacturer	Part Number	Description
Panduit	CGJT	
Panduit	EGJT	
Panduit	CWST	
Panduit	CJAST	
Panduit	TTS-20R0	Tak Tape Rolls
Panduit	HLS-75R0	Bulk Velcro

2.03 SYSTEMS COMPONENTS

- A. Distances mentioned and shown on drawings or spreadsheets are approximate. Field verification shall be made prior to install.
- B. Materials provided shall meet or exceed the standards/description listed below.
- C. Fiber Trunk Cable
 - 1. Corning 12 strand single mode outdoor riser fiber optic cable
- D. Horizontal Cable (Cat6):
 - 1. Solid copper, 24 AWG, 100 balanced twisted-pair (UTP) Category 6 cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA-568-B.2 to 250 MHz. General Cables Genspeed 6000 Enhanced CAT6E meets the specification.
 - 2. Use plenum rated cable in PLENUM air environments only.
 - 3. Use gel-filled cables in OSP environments as under slab concrete, outside near water, etc.
 - 4. Use outdoor plant cable when going in slab or in areas with moisture.
- E. Connectors (Cat6):
 - 1. 8-pin modular, category 6, pinned to T5689B standard.
- F. Faceplates:
 - 1. Provide 1, 2, 4 or 6 port faceplates and use classic style with label window. Fill unused ports with blank inserts.
- G. Patch Frames:
 - 1. Data frame is to be 19" rack mountable, 24 or 48 empty ports for 8-pin modular jacks. Panels shall include a window for labels. Note: unused ports are to be filled in with black blank inserts.

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H. Wire management:

1. On racks the horizontal cable managers shall be Panduit center mounting brackets (WMPF1E) for the wire managers in front for easy access during Moves, Adds and Changes (MACs). Horizontal managers shall be a minimum 1 RU.
2. Vertical cable managers (WMPVHC45E) are to be same height as rack. With fingers in the rear and in the front. They shall to have a bend radius control or strain relief clips. Panduit vertical managers are to be used for extra capacity.
3. Cable runway shall be ladder style or mesh /solid cable tray with a 12" width and 4" depth. The runway shall be mounted to a support loading wall as well as supported to the rack. An angle transition shall be used for adjoining runways or 90 degree bends. A cable drop shall be used to protect cables transitioning from runway to point of termination. If using a ladder style, use cable fingers attached to the sides to prevent spilling of cable over the sides.

I. Cable Pathways:

1. Conduit will be used for cable pathways
2. Penetrations through fire rated walls shall utilize a metallic assembly with fire stop built into the assembly. EZ Path mechanical fire stop by Specified Technologies meets this requirement and shall be used. There is no exception to this.

J. Miscellaneous:

1. Cable ties shall be Velcro with a loop strap. Nylon cable ties shall not be used. If they are they shall be black and strapped with a loose tie so as not to pinch the cable sheath and with enough slack to get snips and fingers between tie and cable. The end of the tie shall be cut off after strapping.
2. Labels for patch panels, faceplates, and cables shall be by one manufacturer. Ex: Label Ware, EasyMark, Brady, LabelMo, etc.
3. All conduits shall have a maximum fill ratio of 60%.
4. All labels including the cable label shall be laser printed.
5. Labeling (Wire and Wall Jacks): All Labeling shall follow the "Tracy U.S.D. Labeling Format" (See "Tracy U.S.D. Labeling Format" Spreadsheet) with exception of workstation cables (i.e. patch cords). Hand written labels are not acceptable. All labels shall be machine printed black lettering on opaque white tape, stenciled onto adhesive labels, or type written onto adhesive labels. The font shall be at least one-eighth inch (1/8") in height, block characters, and legible. Patch panels shall be assembled and terminated in a sequential order, exhibiting room and workstation numbers for all workstations served by the MDF or IDF.
6. Each fiber optics cable segment shall be labeled at each end with its respective IDF identifier. Each fiber interconnect device shall be labeled with its respective IDF identifier.
7. Each telecommunication outlet shall be labeled with its respective workstation number respective (machine labels only).

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8. Workstation Terminal Outlets are to be installed within single-gang or double-gang electrical boxes. No mud-rings are to be used. WAO faceplates are to have labeling which identifies connected IDF.
9. Each copper backbone cable shall be machine labeled and printed EIA/TIA-606 Section 8 compliant only at each end with its respective IDF number/letter. Each binder group shall be tied off with its respective identifying ribbon at each breakout point.
10. Labeling will be completed before testing shall begin; discrepancies during inspection with the labeling will void all test results.

2.04 PROJECTOR

- A. Contractor shall furnish and install Epson Brightlink 1485Fi and associated Epson Pilot control pad

2.05 WIRELESS ACCESS POINT

- A. Contractor shall furnish and install a District approved wireless access points (WAPs)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. On a daily basis, the contractor's project manager shall inspect the installation to ensure that installers are following the specifications and quality craftsmanship. Additionally, the contractor shall coordinate with the owner's IT department all details and specifications per the owner.
- B. Throughout the project regular, interval inspections will be completed by an architect representative to eliminate "unchangeable" installations.
- C. If the representative inspects the site and makes a change to the design or installation, this shall be noted in writing. The contractor shall not complete this change until approval is given.
- D. After installation, the architect representative will first inspect the site and create a closeout punch list for contractor to complete.
- E. After completion, the representative and contractor will inspect the site together.

3.02 SYSTEM SPECIFIC INSTRUCTIONS

- A. Horizontal Cable:
 1. Contractor shall label cables in 2 locations 12" apart.
 2. Contractor is to terminate using the 568B pin out.

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3. Contractor is to leave 10 feet of slack for all cables at the station in the accessible ceiling.
4. All cables will terminate at the stations with RJ45 connectors and shall be housed in a faceplate. If the connector is in the ceiling or behind a faceplate (such as the AV control panel) the connector shall be installed in a surface housing.

B. Closet/Rack:

1. All cables will terminate on the rack on a modular patch panel with an RJ45 connector.
2. A horizontal manager shall be installed above and below every 48 ports of patch panels (CPPL48WBL) and switches.
3. A service coil shall be created above the rack on the wall of the closet. Do not place a service coil within the vertical and horizontal wire management. Cables within those managers shall be kept straight with proper bend radius.
4. The service coil shall be long enough to reach the farthest corner of the room and then down to the floor.
5. Patch frames shall be rack mounted using grounding screws and washers.
6. Note: unused ports on the patch frames are to be filled in with black blank inserts. Also, 1-2 blanks will be installed after each student data, teacher, admin, ceiling, and paging outlet with less than 4 cables to allow for future MACs.
7. Contractor shall place a drawing next to the data rack showing a floor plan with outlet locations and labels that match the rack labels. These drawings are to be laminated or in a plastic casing.

3.03 INSTALLATION

- A. The following are installation practices that ensure superior performance and aesthetics.

- B. NOTE: References to conduit, raceway and electrical are for contractor's information. Actual installation of these components is included in another specification. If contractor notices a difference between actual install and the specs below, the contractor shall bring that immediately to the attention of the electrical engineer.

C. Work Area Outlet

1. The 10 ft coil shall not be a traditional service loop. Rather, the cable shall be extended along the wall then brought back at a lower height.
2. A pull string for MACs shall be pulled with cable into accessible ceiling space or length of conduit. Label strings to indicate destination of conduit.
3. Fill and label faceplates starting in the top left then moving right and downward.
4. In addition to labeling, jacks shall be quickly identifiable by the following color:
 - a. Paging Jack Blue
5. All jacks are to be terminated using 568B pin assignment.
6. Minimize the amount of untwisting in a pair as a result of termination to connecting hardware. The amount of twisting shall not exceed 1/2" for category 6

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and higher cables. Cable sheath shall touch the back of jack after termination (leave no portion of the cable exposed).

7. A classic series faceplate (or surface mount box if needed) with a label window shall be used or the Jack itself labeled (Easy Mark #PLL-46-Y3C-1 or equal).
8. The cable behind the faceplate shall also be labeled to match faceplate.
9. ALL labels are to be machine generated, laminated, and adhesive.
10. Each faceplate shall be labeled with its respective workstation number.

D. Acceptable Pathways:

1. All horizontal cable shall have support, the cable shall never be lain freely and resting on structural supports nor shall they use ceiling grid or lighting support wires.
2. The pathway to the work area shall allow for a minimum of 3 cable runs per individual work area.
3. Pathways shall ensure that a maximum pulling tension 25 lb-f is not exceeded and pathways (or installers) shall not deform the cable jacket. If cable becomes kinked, contractor shall replace the cable.
4. All cable shall be installed within conduit.

E. Conduit:

1. When pulling through conduit, cable pulling lubricants shall be continuously applied to all cables and be specifically approved by the cable manufacturer.
2. Pull string shall be installed in conduit to allow future moves, adds, or changes. If more than one string is installed in a conduit, the strings shall be labeled for identification of destination.
3. Conduits shall have grommets on end to protect the cable.
4. No more than (2) 90 degree turns in a given length.
5. Fill capacities
 - a. Cable pathways shall not be filled greater than the NEC maximum fill for the particular pathway type.
 - b. The fill cable capacity for conduit shall not exceed the following and be no more than 60% full:

1)	1/2"	0 – Do not use
2)	3/4"	0 – Do not use
3)	1"	4 – Do not use
4)	1-1/4"	6
5)	1-1/2"	8
6)	2"	12
7)	2-1/2"	16
8)	3"	24
 - c. Fill capacity for raceway: (See Manufacturer Specs and Size by Cat6 requirements or 8.4mm/.33in diameter cable)
6. Distance Limitations
 - a. Horizontal cable distance (Outlet to Panel) is not to exceed 298 feet.
 - b. Premise cable distance (Outlet to Panel) shall be no less than 55 ft for any cable installed. Coil excess in ceiling if physically closer than 55 ft.

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c. Aerial cable shall not be utilized.

F. Bend Radius Limit

1. The minimum bend radius for copper cable 4x cable diameter which is approximately 1.24 inches (31 mm).
2. The minimum bend radius for indoor (ISP) backbone optical fiber when under no load is 10 times the cable diameter and while it is being pulled it is 15 times.

G. EMI Avoidance

1. Cabling shall be installed to avoid devices that cause electromagnetic interference, such as Microwaves, Refrigerators, lighting, ballasts, power panels, etc.
2. Keep a minimum of 6" from electrical conductor cable.
3. Telecommunications conductors shall not be routed closer than 6 ft. from any lightning protection system conductor.

H. Cabinets and Racks

1. Only black Velcro cable ties shall be used for bundling and routing. Bundles shall be loose and Velcro ties shall have at least 18 inches between and the bundle shall be loose enough to place two fingers between the cable and the ties.
2. The service coil at the rack shall be located above the rack on the ladder rack/cable tray system or on the wall. Do not place the service coil within the vertical and horizontal wire management.
3. Entrances to cabinets shall be protected with grommets and shall have a conduit stubbed to ceiling space.
4. Installer shall create a detailed floor drawing designating jack locations and labels. A copy shall be attached inside the cabinet or back wall of the rack. The drawing shall also have the date and contractors contact information.
5. Installer shall ensure that every telco rack/cabinet shall have separate and individual patch panels for workstation data cabling for each classroom, office or room space. In-addition, separate and individual patch panels shall be installed for each individual system such as: Extron A/V, Valcom IP Paging, Security Surveillance, and Wireless Access Point devices.

I. Wire Management

1. When bringing cable into the data rack, keep the bundle size small (optimum size may be 12 cables no more than 24 cables).
2. Velcro Ties shall be used in place of cable ties. Do not cinch cables so tightly to deform the cable in any way. It is recommended to leave Velcro ties loose enough to get fingers in between without deforming cable. Velcro ties shall be placed no less than 18 inches from other Velcro straps.
3. Every 48 ports of patch frame shall have its own wire manager below and above (except angled patch frames). The manager shall be d-rings on the front for easy access for MACs. Rear management shall also be used and may be finger style or bar style.

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4. In addition to the horizontal managers, the installer shall either install a vertical (WMPVHC45E) Panduit center mounting brackets for the wire managers for vertical management.
5. In addition to binding in Velcro ties, ring runs shall be used for cables run in corners and for drop and rise on walls. These bundles shall be labeled indicating the destination of the bundle (i.e. floor horizontal cables, to TR2, etc.).
6. When cable bundles transition from wall to a floor rack a cable tray or ladder rack shall be utilized. Install brackets on sides to prevent cables from falling off the rack if ladder rack is used.

J. Fire Stopping

1. All procedures in this category shall be done in accordance with authority having jurisdiction (AHJ), local codes, CEC, CFC, and insurance underwriter's requirements. If a procedure in one of these effects performance, the AHJ shall be alerted immediately in writing.
2. Ensure that materials used are U.L. Listed.
3. For sleeves through ALL walls, EZ Path by Specified Technologies shall be used to ensure a fire stopped pathway.
4. Contractor shall put a label per ANSL11A/EIA 569 with warning to not remove, company name and phone number, and date next to each penetration. Contractor shall also place a label stating how many cables can fit within the EZ Path. If initial install fills the firestop, the label shall read "Capacity full — DO NOT ADD CABLES". Do this labeling and take a picture to include in close out documents. Cabling will not exceed 60% fill.
5. If the firestop capacity is filled more than 85% during initial, contractor shall install an additional EZ Path.

K. Grounding and Bonding

1. All network equipment, shielded cables, patch panels, racks, and tray/ladder rack segments shall be Bonded and Grounded according to TJNEIA 607, BICSI guidelines, CEC, insurance underwriter's requirements, and local code (AHJ). The purpose is to provide a path to ground for all components to ensure personal safety and equipment protection.
2. Ensure that materials used are UL Listed.
3. Conduits that contain grounding backbone conductors shall be bonded to the grounding conductor at each end of the conduit. This negates the high impedance choke" effect while the cable carries lightning currents.
4. All racks, trays, and electronics shall be grounded.
5. Contractor shall install on rack an ESD Port Kit on each rack in front and back.
6. The use of aluminum conductors is discouraged in the establishment of grounding scenarios. Aluminum does not provide the lowest resistive path. Additionally, aluminum conductors can become loose from mechanical screw/bolt connections due to vibration from carrying AC current.
7. Panduit's Data Center Grounding Solution and components shall be used. The following components shall be used to form a complete system (see the detailed drawing): Cabinet Grounding Complete Kit, Common Bonding Network Jumper

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(CBN) Kit, Surge Suppressor Jumper Kit, Front to Back Rail Jumper Kit, Rack Ground Strip Kit, Grounding Bus bar Kit, Paint Piercing Grounding Washers Kit, Thread Forming Screws, and Electrostatic Discharge (ESD) Discharge Port Kit.

8. Contractor shall test the ground system to ensure it has less than 5 Ohms. The test results shall be documented and submitted in close out docs.
9. Documentation: Contractor shall provide a single set of documentation to include test results and Visio "As-built" drawings in both soft copy and hard copy format.
 - a. Workstation Cable: The results of the workstation cable tests shall be provided in the form of printouts from the test equipment as well as computer file copies on CD with the software to read the results included. Test results shall be in PDF format.
 - b. As-Built Drawings: Contractor shall produce drawings depicting data outlet locations as they are actually installed. The drawings shall indicate actual cable routing, work station locations and workstation numbers, to be submitted before final inspection for punch list. Incorrect Visio drawings are punch list items and are to be corrected before re-inspection. "Tracy Unified School District's Telecommunications Jack Legend" shall be applied to all drawings. Results shall be returned to ISET within 30 days.

3.04 FIELD QUALITY CONTROL

- A. On a daily basis, the contractor's project manager shall inspect the installation to ensure that installers are following the specifications and quality craftsmanship.
- B. Throughout the project regular interval inspections will be completed by an architect representative to eliminate "unchangeable" installations.
- C. If the representative inspects the site and makes a change to the design or installation, this shall be noted in writing. The contractor shall not complete this change until approval is given.
- D. After installation, the architect representative will first inspect the site and create a closeout punch list for contractor to complete.
- E. After completion, the representative and contractor will inspect the site together.
- F. Testing:
 1. Testing shall be done with a Fluke Level IV cable tester (DTX 1800 meets this specification) and an Optical Time-Domain Reflectometer (OTDR). The new Fluke DTX 1800 unit is one test set that is capable of testing all frequencies through 900 MHz. If another manufacturer provides this test, contractor shall submit spec sheets and receive written approval for the tester prior to testing.
 2. Contractor shall ensure that the tester has been manufacturer calibrated within nine months of testing and has the latest software version downloaded.
 3. Prior to testing, the tester shall be set for the specific cable and jack used on the project.

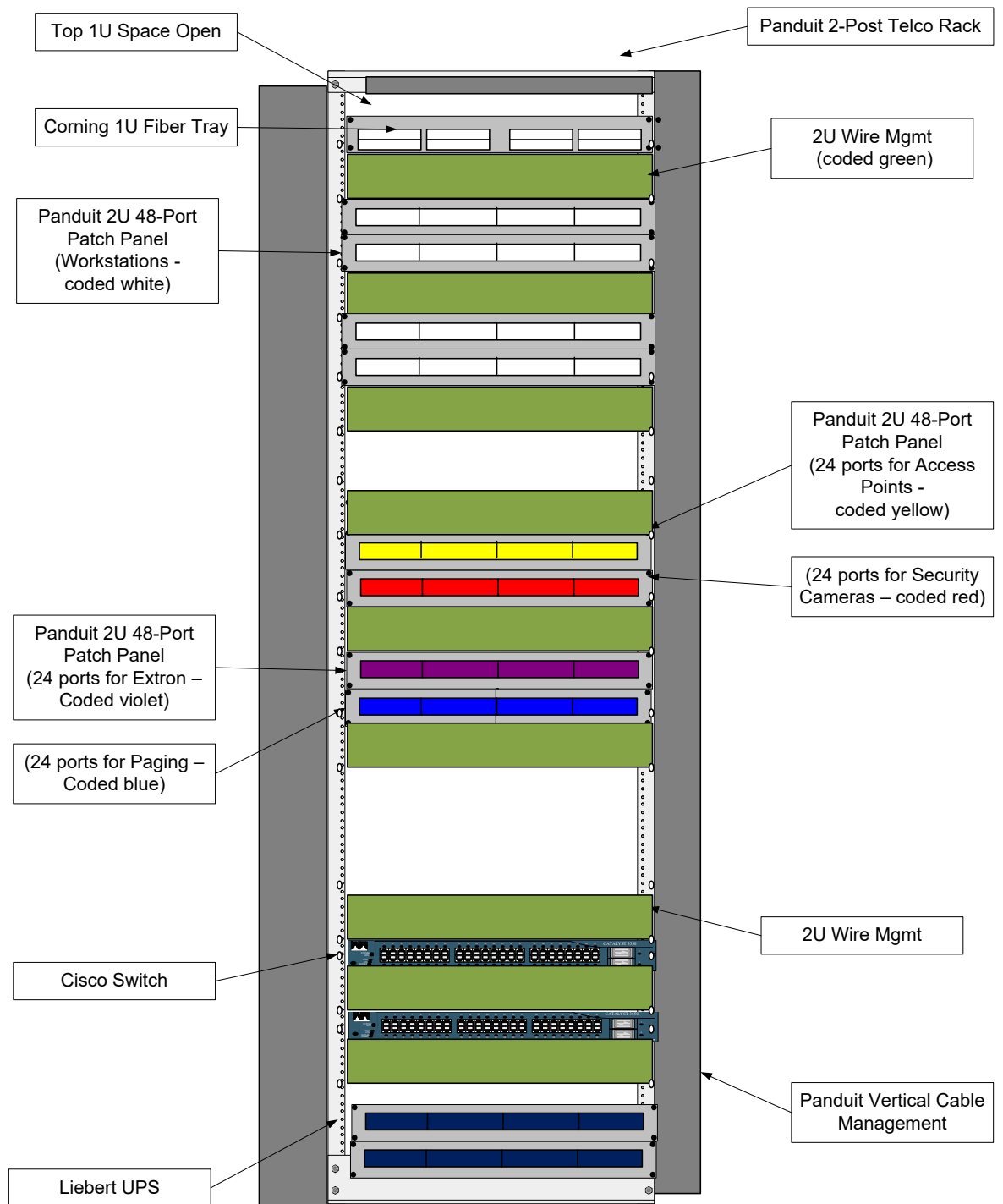
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4. A summary test report shall be submitted as well as detailed reports for each cable.
5. All test results shall have the individual cable label and project name in the header along with the date and time of testing.
6. Test results shall clearly indicate a Pass or Fail on the report. If a cable fails in one parameter the test is considered a Fail. Marginal Pass cables (indicated with an asterisk) are not acceptable and will be considered as a Fail.
7. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.
8. Test reports shall show a pass result for network standards, continuity, length, cross- talk, attenuation, and ambient noise.
9. No Splices will be accepted.
10. Prior to the work commencing and on conclusion of the work, an optical time domain reflectometer (OTDR) test will be required on any existing fiber pathways impacted by this project. New fiber optical cabling shall be tested upon completion of work. District IT will provide final acceptance of the OTDR test results and sufficiency.

3.05 IDENTIFICATION

- A. The labels are to be laser printed onto adhesive labels using software and labels by Label Ware, Easy Mark, Brady, LabelMo, etc.
- B. Each cable is to be labeled using the following pattern: XXX-A##
 1. Segment XXX: Designates the location where the other end of the cable is. That is, at the station it says what room the patch panel is, and at the patch panel it says what room the station is.
 2. Segment A: Designates which patch panel the cable is terminated. This allows 26 patch panels per closet.
 3. Segment ##: Designates which port on the patch panel the cable is terminated.
- C. Segment A and ## shall be the same on both sides of the cable.
- D. Contractor is to place labels onto the faceplates and panels. In addition, contractor shall place an adhesive label on each end of the cable.
- E. Layout of an IDF rack (not to scale). Rack height shall be 72".

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F. Labeling Format

1. All data cables at both the patch panel and the data jacks shall be labeled using the following standard labeling format. The labels are to be laser printed onto adhesive labels using software and labels by Label Ware, Easy Mark, Brady, LabelMo, etc.
2. Telecommunication outlets for a Valcom IP Paging horn, speaker or clock/speaker shall be labeled with its respective Valcom IP device number (machine labels only). Valcom numbers shall be comprised of the room number (i.e. C1, C2, etc.) and Valcom IP device number/drop number (i.e. PA1, PA2, etc.). Each data cable at a telecommunications outlet shall have an alpha identifier for the data jack (i.e. A). No biscuit shall be used and the data jack should be placed inside the Valcom back box. The labeling will start from the main door entering the room and go clockwise around the room. Each workstation cable shall be neatly labeled at each end with its respective workstation number.
3. Labeling for the respective port on the MDF/IDF patch panel shall be:
 - a. C1 – PA1 – A

3.06 CLEANING

- A. All work shall be cleaned to remove all dust, dirt, grease, paint or other marks. All electrical equipment shall be left in a clean condition inside and out, satisfactory to the owner. Keep buildings and premises free from accumulated waste materials, rubbish and debris resulting from work herein, and upon completion of said work, remove tools, appliances, surplus materials, waste materials, rubbish debris, and accessory items used in or resulting from work and legally disposed of offsite.

3.07 CLOSEOUT

- A. The contractor will submit to owner within thirty days of completion a closeout package containing:
1. Hard copy and electronic test results
 2. Hard copy and electronic as-built drawings with labels
 3. Warranty information and manuals
 4. A bill of materials with part numbers to be used for later MAC
 5. Electronic pictures
- B. As prerequisite to final acceptance, supply to the owner certificates of inspection from IOR and owner designated representative.

END OF SECTION

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SECTION 27 51 23 – SOUND AND COMMUNICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the sound/communications system on this project
- B. Work Included
 - 1. Furnish and install new Internet Protocol (IP) devices into existing IP sound/communications system with clock subsystem, including all wiring and connections and other materials as shown in the Electrical Drawings and specified herein. It is the intent that complete operating systems be installed and that any power supplies, transformers, modules, cards, cages, programming, or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
 - 2. IP School Application VoIP equipment supplied by Valcom, Inc. shall be considered as meeting all specification requirements and the District Standards.
 - 3. The system shall provide distribution of intercom, overhead paging, emergency paging, class change time tones and emergency tones.
 - 4. System shall be UL 813 and FCC Part 15 listed for safety reasons. Systems not listed are not acceptable.
 - 5. Site and System Investigation: The bidding contractor for the sound/communications system shall visit the site prior to the bid and become thoroughly knowledgeable about existing system and work required to perform work of this section. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.

1.02 GENERAL REQUIREMENTS

- A. System Requirements: All of various equipment components to be complete with all appurtenant accessories required to provide specified facilities and perform specified functions throughout presently planned construction and space; and provisions for expanding system to provide same facilities, and perform same functions in all future planned construction, including space and mountings in consoles and terminal backboards.
- B. Equipment Tests and Standards:
 - 1. For all equipment operating at 26 volts or more, or utilizing over 50 watts, Contractor to submit proof within time allowed for submittals that all items of equipment will conform to requirements of U.L. Label or listing of equipment by U.L. to be accepted as evidence of conformance.

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2. For all items of equipment operating at 25 volts or less, and utilizing less than 50 watts, Contractor may submit, in lieu of such label or listing, written certificate from any nationally recognized testing agency, adequately equipped and competent to perform such services, that each item has been tested and conforms to U.L. standards, including method of test of U.L.
- C. Instructions and Manuals:
1. Equipment supplier of systems to demonstrate operation of systems to satisfaction of Owner and furnish Owner three (3) wiring schematics and a list of MAC addresses for all items of equipment, installation instructions, and details of all routine maintenance and servicing which must be given systems by Owner. Manuals shall be provided in 3-ring binders, with title page, list of contents, and conspicuous label on cover and shall be delivered to District. Submit copy to Architect for approval before delivering to Owner.
 2. Supplier shall demonstrate operation of systems and provide training to all end users, administrative staff, and system administrator. Coordinate times of instruction with District, at District's convenience. Supplier shall provide a minimum of 2 hours of user instructions to clerical staff and 4 hours of user/maintenance instructions to District maintenance personnel. Instruction periods shall not coincide and shall be scheduled with District, not school staff. District shall provide list of authorized personnel for training sessions.
- D. Submittals:
1. Refer to Section 27 1000.
 2. Contractor shall submit name of firms he proposes to do work under this Section, addresses, phone numbers, and name of firm's contact, for approval. Such firms shall be factory authorized representatives of the existing system and submittal shall include manufacturer's letter of confirmation. Proposed firm shall furnish all equipment and specialty cables, make all connections to same, and place the systems in operation. Such firms shall have offices and service departments within a 100 mile radius of project and shall have been in business of this type for at least five years.
- E. Record Drawings:
1. Final Inspection will not be made until drawings are received and approved. Record Drawings shall include "As Built" one line and wiring diagrams, with terminations identified, wire color coding schedule, pullbox locations, and conduit routing plans.
 2. The Contractor shall provide complete drawings detailing all interconnections and panel wiring diagrams in Visio 2000 format.
- F. Guarantee:
1. One firm to assume full responsibility for performance on all work of this section. Guarantee all equipment against defects in material and workmanship for two (2) years, and provide on the premises service during normal working hours for two years, at no cost to Owner if trouble is not caused by misuse, abuse, or accident,

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- or at current labor rates if so caused. Provide manufacturer's written one year guarantee for equipment and parts to Owner.
2. Service shall normally be available within 24 hours from service department of authorized distributor of manufacturer by factory trained servicemen.
 3. On the premises service at other than normal working hours to also be available, but labor charges for such calls to be paid by Owner at current labor rates.

PART 2 - PRODUCTS

2.01 SOUND/COMMUNICATIONS SYSTEM

- A. General: Install new IP devices into existing IP Intercommunications System.
- B. Exceptions to these specifications are not acceptable. Substitutions are not permitted.
- C. Verify existing server is provided and programmed. Server shall be Valcom VE6025, or similar.
- D. Provide station ports as required – Valcom VE8012BR.
- E. Equipment Standards:
 1. All enclosures for all equipment to be of metal throughout system. Enclosures other than metal are not acceptable.
 2. Speaker grilles to be non directional diffusion type insulated from speaker by fiber mounting board. Dampening material to be installed between mounting board and grille to prevent metallic resonance.

2.02 SYSTEM CABLING

- A. Each clock/speaker and speaker shall have a Category-6 cable homerun from the local data rack. The cable shall be terminated on a jack and surface mount box inside the provided housing.
- B. Electronics contractor completing this specification shall provide the patch cord for connecting the speaker to the jack. Contractor shall provide a 1 foot (or shorter) blue patch cable.
- C. Refer to Section 27 10 00 for wiring requirements.

2.03 DEVICES

- A. Combination Clock/Speaker: Valcom VE4031A-A with VB-R19 recess mounting backbox.
- B. Outdoor Speakers: Valcom V-1080-GY with V-9805 vandal resistant enclosure and VE8004 gateway.

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PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

- A. Electrical Contractor shall retain the services of the duly appointed representative as specified hereinbefore, who shall furnish all equipment, make all connections to same, and place system in operation. Technician and workman employed shall be particularly skilled in this type of work. Workmanship on installed systems shall be of professional quality, best commercial practice.
- B. All wiring throughout entire system shall be installed in conformance with standard industry practice.
- C. Station locations shall be identified by location and school's actual room numbers as furnished by District, and in all ways shall relate as closely as possible to record wiring drawings. Prior to performing final labeling and programming, coordinate information with District.

3.02 CONSTRUCTION MEETINGS

- A. The Contractor shall schedule construction meetings at the jobsite as follows:
 - 1. Prewire meeting shall occur after raceways are installed and prior to pulling of any wire or cable.
 - 2. Pre termination meeting shall occur after wire and cable has been installed and prior to termination.
- B. Meetings shall be scheduled by the Contractor on a building-by-building basis and shall include the Project Inspector, School's Representative, the electrical subcontractor, and the Signal System subcontractor as a minimum.

3.03 TESTS

- A. After all equipment specified herein has been installed and is in operating condition, performance tests shall be conducted to determine that installation and components comply with these specifications. Contractor shall furnish competent personnel for these tests.
- B. Perform initial programming of system and audio level adjustments.
- C. Contractor shall physically walk to each speaker and ensure that sound is coming from each speaker.
- D. Contractor shall set the volume level to approximately 6 dB above ambient noise during occupancy.
- E. The sound level for each speaker and zone shall be tested with an audio meter.

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- F. Contractor shall provide a drawing showing dB levels for each speaker and zone. The drawing shall be dated and signed by the person administering the test.
- G. Contractor shall test the extension for each room. Extension also be noted on the drawings.
- H. Testing shall be scheduled with the Owner and shall occur after receipt by Architect of Contractor's written certification of completion, record one line diagram, wiring diagrams, maintenance and operation manuals, and other "As Built" data required by these specifications. Tests shall be scheduled with School before occupancy occurs.

END OF SECTION

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SECTION 28 31 00 – INTRUSION ALARM

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes the requirements for the intrusion alarm system on this project.
- B. Work Included
 - 1. Furnish and install extensions to the existing intrusion alarm system including all wiring and connections and other material as shown on in the Electrical Drawings and specified herein. It is the intent that a complete operating system conforming to all applicable codes and District Standard be installed and that any power supplies, relays, keypad, cards, modules, programming or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
 - 2. Site and System Investigation: The bidding contractor for the intrusion alarm system shall visit the site prior to the bid and become thoroughly knowledgeable about the existing system and work required to perform work of this section. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.

1.02 REFERENCES AND STANDARDS

- A. California Electrical Code (CEC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- B. California Fire Code (CFC), edition as noted on the Drawings, as adopted by the California Division of the State Architect (DSA).
- C. National Fire Alarm Code with California Amendments: NFPA 72
- D. Title 4 of the Americans with Disabilities Act
- E. Title 19 of the California Code of Regulations

1.03 SUBMITTALS

- A. Product Data
 - 1. Contractor shall submit name of firm he proposes to do work under this Section, addresses, phone numbers, and name of firm's contact, for approval. Such firms shall be factory authorized representatives of the system and submittal shall include manufacturer's letter of confirmation. Proposed firm shall furnish all

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equipment and specialty cables, make all connections to same, and place the systems in operation.

B. Operation and Maintenance (O&M) Manuals

1. Operating Instruction Manuals outlining the step-by-step procedures required for system start-up and operations shall be furnished. The instructions shall include manufacturer's name, model number, service manual parts list, and brief description of all equipment and their basic operating features.
2. Maintenance Instruction Manuals outlining maintenance procedures shall be furnished. The manual shall include a troubleshooting guide listing possible breakdowns and repairs and a simplified connection wiring diagram for the system as installed.

C. Shop Drawings

1. Drawings shall contain complete wiring and schematic diagrams for equipment furnished, equipment layout, conduit and wiring layout drawings, and any other details required to demonstrate that system has been coordinated and will properly function as a unit. Equipment Vendor shall check Drawings for adequacy of conductors and raceways for proposed system. Include in Bid Amount all required raceways, conductors and material necessary to suit proposed system.

D. Record Drawings

1. Final Inspection will not be made until drawings are received and approved. Record Drawings shall include "As Built" one line and wiring diagrams, with terminations identified, wire color coding schedule, pullbox locations, and conduit routing plans.

E. Furnish to District a printed copy of the control panel programming upon completion of final system programming.

F. Performance Test Reports: Upon completion of installed system, submit in booklet form all field tests performed to prove compliance with the specified performance criteria. Each test report shall indicate the final position of controls.

1.04 QUALITY ASSURANCE

A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.

B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.

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- C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:
1. California Electrical Code (CEC)
 2. California Building Code (CBC)
 3. California Green Building Code (CGC)
 4. California Fire Code (CFC)
- D. Contractor Qualifications
1. Per District Standards the installing contractor shall be Sierra Building Systems, Inc.
 2. Fabricator/Installer/Vendor shall be licensed contractor and servicing agent, as well as installer for all components and systems in this System and be acceptable to manufacturer of the major components of the system. Service personnel shall be capable of serving any and/or all components of the System.
 3. Fabricator/Installer/Vendor must be able to present evidence of technical expertise, be a firm who has successfully installed projects of a similar scope to this project for a minimum of five (5) years and shall maintain service office within 100 miles of the project site.
 4. All equipment is to be manufactured by a firm(s) who have successfully fabricated elements/systems of a scope similar to this project for a minimum of ten (10) years.
 5. Have a valid State of California Contractor's license in classification C10 - Electrical.
 6. Provide authorized dealer service on-site at facility within four (4) hours of a problem being reported, with this response time available twenty-four (24) hours per day, seven (7) days per week.
 7. Affirm that he maintains, or will maintain, or has access to, a stock of system spares sufficient to ensure that no element of the System will be out of service for more than twenty-four (24) hours due to lack of proper spares.
- E. System Requirements: All of various equipment components to be complete with all appurtenant accessories required to provide specified facilities and perform specified functions throughout presently planned construction and space; and provisions for expanding system to provide same facilities, and perform same functions in all future planned construction, including space and mountings in control panels and terminal backboards.
- F. Interruption of Service: Existing intrusion alarm system must be kept operational during unoccupied hours. In the event that the system or portion of system is nonoperational during off-hour periods as a result of work of this contract, the Contractor must provide guard(s) to patrol the campus. Guard(s) and guard duties proposed by Contractor must be acceptable to District and District Police (local enforcement if District does not have its own Police Services). All costs for security guard(s) shall be Contractor's responsibility.

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G. Guarantee

1. One firm to assume full responsibility for performance on all work of this section. Guarantee all equipment against defects in material and workmanship for two (2) years, and provide on the premises service during normal working hours for two years, at no cost to Owner if trouble is not caused by misuse, abuse, or accident, or at current labor rates if so caused. Provide manufacturer's written one year guarantee for equipment and parts.
2. Service shall normally be available within 24 hours from service department of authorized distributor of manufacturer by factory trained servicemen.
3. On the premises service at other than normal working hours to also be available, but labor charges for such calls to be paid by Owner at current labor rates.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Acceptable Manufacturer: North America: Bosch Security Systems, Inc.; 130 Perinton Parkway; Fairport, NY 14450. ASD. Toll Free Tel: 800-289-0096. Tel: 585-223-4060. Email: request info (presales.support@us.bosch.com). Web: www.boschsecurity.us.

2.02 SYSTEM DESCRIPTION

- A. Existing control panel shall be examined to provide the following features:
1. The DACS control panel shall be Bosch Security Systems, Inc. model B9512G comprising a fully integrated intrusion and residential fire control system. The control panel shall support the following:
 - a. The DACS system is capable of being utilized as a combination Intrusion and Commercial Fire system per code. Fully integrated intrusion and fire functions allow users to interface with 1 system instead of 2
 - b. Optional Telephone Line Module, programmable for signaling and supervision.
 - c. Integrated Conettix IP based communication provides high-speed, secure alarm transport and control.
 - d. 32 programmable areas with perimeter and interior partitioning.
 - e. 8 on-board, hardwired points with expansion capability for a total of 599 using a combination of wired or wireless points.
 - f. Compatibility with Color Graphic Touch Screen, 2-line alpha numeric capacitive touch, ATM style LCD or 2-line LCD style Alarm Keypads.
 - g. Local or remote programming, test, and diagnostic capability via a computer running the Remote Programming Software (RPS).
 - h. The system shall include an integrated USB port for local programming and diagnostics using a computer running Remote Programming Software (RPS) and a male USB2.0 to male USB 2.0 cable with no additional hardware modules required.

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- i. The system shall support the use of an Apple iOS device and/or Android device for control. Functions to include arming, disarming and control of outputs and access door, viewing of connected IP cameras. This application shall connect directly to the DACS using internet, wifi or cellular communications and shall not require a third party server or network operations center (noc).
- j. The DACS will allow integration with up to 16 Bosch IP video cameras using the built-in Ethernet connection, allowing the cameras to act as inputs and outputs.
- k. The DACS shall support integration with the Bosch Video Management System (BVMS) using the built-in Ethernet adapter.
- l. The DACS shall support up to thirty-two (32) custom functions allowing the installer to combine up to 6 functions into one command. These custom functions shall be operated by keypad command, point activation, keyfob button, or programmable schedule
- m. The DACS shall support up to 32 keypad shortcuts which allow the installer to define which commands are available at each keypad.
- n. The DACS shall support flash firmware upgrades of systems firmware for the control panel and peripherals, allowing for future updates.
- o. Integrated real time clock, calendar, test timer and programmable scheduling capability for relay control and automatic execution of system functions based on a time / event.
- p. Provide 1.4 amps of power for standby operation and 2.0 amps of alarm power, both rated at 12 VDC.
- q. 3 configurable form 'C' wet or dry-contact relay outputs with expansion capability for up to an additional 472 dry-contact relay outputs.
- r. Integrated battery charger with reverse hook up protection, battery supervision and battery deep discharge protection.
- s. Supervision of peripheral devices and communications interface(s).

B. Point Functionality and Expansion:

- 1. The system shall support a programmable Monitor delay functionality for supervision of points during disarmed periods. These points may be programmed to ignore status from 1 to 60 minutes and will activate only if the point is off-normal for this time period.
- 2. The system shall support a programmable delay response functionality for supervision of points during armed or disarmed periods. These points may be programmed to ignore status from 1 to 60 minutes and will activate only if the point is off-normal for this time period.
- 3. The system shall support virtual points and outputs for customized programming of events
- 4. The DACS shall be capable of supporting "group zoning." Group zoning refers to the combining of points into a separately identifiable and separately annunciated (programmable text) areas.

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5. The DACS shall be capable of allowing variable point response times via programming. Point response times shall be programmable over a range of 300 milliseconds to 4.5 seconds.
6. The DACS shall have the capability to expand up to 599 separately identifiable points, of which 8 are on-board and 472 are off-board wired, addressable or wireless points.
 - a. The 8 on-board points shall be able to accommodate powered class B functionality using a powered loop interface module.
 - b. Point Expansion Modules (Wired and Wireless) shall be able to be located remote to the main panel to a maximum distance of 1000 feet.
 - c. Addressable modules shall be able to be located remote to the panel to a maximum of 500 feet.

C. Areas/Accounts:

1. The DACS shall support 32 independent areas. Each of the 32 areas shall have custom text associated with the armed state, disarmed state and point-off-normal state.
2. The DACS shall be capable of assigning 1 to 4 account identifiers to the areas depending on the distribution of areas per account.
3. The DACS shall be capable of assigning 1 to 2 account identifiers to the areas depending on the distribution of areas per account.
4. All of the areas must be capable of Master (All) and/or Perimeter (Part) arming (excluding predefined Interior protection).
5. The DACS shall be capable of logically grouping 1 or more points into an area, or conversely, dividing 2 or more points into two or more areas.
6. Any area shall be configurable to allow arming by specific users when a programmable number of devices are faulted or bypassed.
7. Area(s) shall accommodate assignment of independent account numbers to define annunciation, control, and reporting functions.
8. The DACS shall be capable of linking multiple areas to a shared area which may be automatically controlled (hallway or lobby).

D. Output Relay Expansion: The DACS shall provide the capability for output relay expansion using relay expansion modules. Independent control of relay functions by area shall be possible through programming assignments.

1. The DACS shall be capable of activating 472 additional relay outputs for auxiliary functions based on its classifications (area vs. panel wide). Output Expansion Modules shall be able to be located remote to the main panel to a maximum distance of 1000 feet. 8 relays (Form C) are to be provided per octo-relay module
2. The DACS shall be capable of activating 64 additional relay outputs for auxiliary functions based on its classifications (area vs. panel wide). Output Expansion Modules shall be able to be located remote to the main panel to a maximum distance of 1000 feet. 8 relays (Form C) are to be provided per octo-relay module

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- E. Alarm Keypads:
1. The DACS shall accommodate connection with up to 32 ACCs, each capable of displaying custom English, Latin American Spanish, Portuguese, Canadian French, Hungarian, Greek, Italian, Polish, German, Dutch, Swedish and/or Chinese text on a liquid crystal display.
 2. The Alarm Keypads shall accommodate viewing and configuration of system parameters including:
 - a. Network Parameters
 - b. Point Parameters
 - c. Event Routing Parameters to allow programming of up to 4 report routing groups as well as configuration of primary and secondary paths.
- F. User Passcodes and Authority: Passcodes shall be programmable with authority levels to allow users to operate any or all areas.
1. Up to 2000 different passcodes shall be accommodated
 2. Up to 500 different passcodes shall be accommodated.
 3. Each passcode shall be 3 to 6 digits (variable) and be assigned a 32-character user name
- G. Access Control: THE DACS shall support access control using the B901 access control module(s).
- H. Communication: The DACS shall be capable of reporting system events and supervisory reports including alarm, trouble, missing modules, restorals, system status, AC failure, battery status to primary and secondary off-site DACR's. The following features shall be supported.
1. The DACS shall be capable of communicating via dial-up analog telephone lines, over a LAN/WAN/Internet using a wired network interface module, or over a cellular network.
- I. Network Communication: The DACS shall be capable of network communications over a LAN, WAN, Intranet, or the Internet. The system shall include supervision of the network communication utilizing configurable periodic heartbeats to the Digital Alarm Communications Receiver (DACR). The DACR shall provide notification of the loss of communications from a networked system after a programmable timeframe since the last communication. The notification options shall be programmable and include local annunciation or indication to automation software.
- J. Event Log: The DACS shall maintain a log of events indicating time, day, month, year type of event, account number, area number, user ID, point text, user text and primary/secondary event route. The system shall allow the following characteristics:
1. The DACS shall be capable of storing up to 10,000 events
 2. The DACS shall support viewing of logs locally at the ACC and remotely via an upload to a remote central station computer running the RPS software.

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3. The DACS shall provide notification via a report to the DACR when the event log reaches a programmable "percent full capacity". This allows retrieval of stored events via RPS to prevent any loss of event history.
- K. Testing, Diagnostic, and Programming Facilities: The DACS shall be capable of sending (manually or automatically) test and status reports to remote DACRs.
- L. Miscellaneous Features: Programmable alarm output timer, 4 programmable entry delay times, exit delay programmable by area, individually programmable point of protection text, point bypassing, key switch arming capability with LED outputs, and fire verification.
- M. False Alarm Reduction: The DACS shall comply with all ANSI SIA CP-01 2010 requirements for false alarm reduction
- N. Ambush Detection: The DACS shall include an early ambush feature that requires that the user disarm, and then inspect the facility within a specified time period, before entering their passcode or a different authorized passcode again. If the user does not enter a passcode a second time, a duress event is generated. If the user does enter a passcode within the specified time period, the system disarms.

2.03 COMPONENTS

- A. Equipment and accessories furnished under the terms of these specifications shall be the standard products of the manufacturers specified or required. All equipment shall be listed by U.L. All equipment and accessories shall be compatible with the system.
- B. System Integration:
 1. System shall integrate with facility doors, windows, and departments. The system shall also integrate with external systems, such as building appliances and building alert systems for remote control and central collection of external system alerts. When integrated with external systems, the system shall connect to the external system to receive status changes by way of a dry contact output from the external system. The system shall use its user interface to provide local status messages from external systems, providing for the initiation of local building policies. Optionally, the system may transmit information to an off-site monitoring service to provide initiation of remote policies when appropriate. The installer shall follow manufacturer's instructions when installing and programming system equipment.
 2. Zone Input: System zone inputs allow the system to sense the change in state of an output from an external device, such as a door/window position sensor, a motion detector, a relay output from an appliance, the output of an external alert system, or other devices that provide a dry closure output.
 3. Door Contact: Bosch ISP-MCS2-FP110 surface mount sensor.
 4. Motion Detector, Wall-Mounted: Bosch ISC-BDL2-WP12G Dual-Tec Motion Detector.
 5. End of line resistors, as required.

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- C. Wiring: The contractor shall provide cables consistent with the manufacturer's recommendations. The following general guidelines shall be followed for wiring installation:
1. Wiring shall be appropriately color-coded with permanent wire markers. Copper conductors shall be used.
 2. All signal cables provided under this contract shall be Class II, plenum-rated cable where required. Where subject to mechanical damage, wiring shall be enclosed in metal conduits or surface metallic raceway.
 3. Data wires shall not be enclosed in conduit or raceways containing AC power wires.
 4. Where EMI may interfere with the proper operation of the DACS circuits, twisted/shielded cable shall be used.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Furnish and install extensions to the existing Intrusion Alarm System including all wiring and connections and other materials as shown on Plans and specified herein. It is the intent that a complete operating system be installed and that any power supplies, relays, resistors, cards, modules, programming, or other items required to achieve this end result shall be furnished whether or not such item or items are specified herein.
- B. Site and System Investigation: System bidder shall visit site prior to bid and become thoroughly knowledgeable about existing system and work required to perform work of this section. Failure to discover the equipment, materials, and labor required to complete the extensions will not relieve the contractor from completing the work at no additional cost.
- C. Proprietary Systems: Where school is protected and monitored by a proprietary system, such as ADT or Sonitrol, Contractor shall coordinate the exact requirements with those firms. If the Division 16 Contractor elects to use a sound and signal firm other than the proprietary company, the sound and signal firm must include in bid, the materials, equipment, and labor required by the proprietary company to make the extensions complete and fully functional.
- D. Work shall be installed as shown on the Drawings in accordance with the manufacturer's diagrams and recommendations, except where otherwise indicated.
- E. Electrical Contractor shall retain the services of the duly appointed representative as specified hereinbefore, who shall furnish all equipment, make all connections to same, and place system in operation. Technician and workman employed shall be particularly skilled in this type of work.
- F. At existing sites, the existing system shall be tested as soon as possible after award of contract and prior to preparing submittals. Contractor shall test entire system to ensure

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proper operation. Any defects or deficiencies found shall be listed and presented to Owner in letter form. It will be assumed that existing equipment is fully functional unless identified otherwise by Contractor.

- G. Control panel shall be mounted with sufficient clearance for observation and testing.
- H. All junction boxes must be clearly marked for distinct identification.
- I. Panel enclosures shall comply with the Requirements of UL 864. Enclosures having doors over forty-eight inches (48") in height shall be provided with a three (3) point catch and lock; all other doors shall contain a cabinet type cylinder lock. Inserts shall be blind fastened so that no screws show on panel front.
- J. Detectors shall be installed in accordance with manufacturer's written instructions in areas as indicated on the Drawings.
- K. Circuits shall be terminated on screw terminals. Terminal blocks shall be Allen Bradley Bulletin 1492 with 600 volt screw terminals for #22 to #10 conductors, mounted to type N22 channel, or approved equal. Submittal shall show internal elevation of terminal cabinets with equipment laid out.
- L. All cables shall be run through fanning strip to terminals of terminal blocks.
- M. All cables entering terminal cabinet shall be identified with T&B Vinyl, Brady Permashield mylar markers, or equal. Upon completion of installation, six (6) copies of one line "as built" wiring diagram shall be furnished to Architect.
- N. Each cable run on wiring diagram shall be identified with exact wire marker code (numerical or alphabetical) as appears in terminal cabinets.
- O. Detector locations shown on drawings are approximate only. Exact locations shall be coordinated with lighting and mechanical equipment and shall be placed in accordance with manufacturer's recommendations (with respect to supply air diffusers, etc.).
- P. Station locations shall be identified by school's actual room numbers and system shall be programmed accordingly. Coordinate actual room numbers with District. Coordinate final programming with District. Contractor shall furnish a printed copy of final programming to District.
- Q. End of line resistors shall be installed at locations readily accessible, not above an elevation of 10 feet above finish floor or grade, or as shown on Drawings.
- R. No splices shall occur in underground pullboxes. System wiring shall be continuous, without splices, from terminal cabinet to terminal cabinet and control panel to devices. All interior pullboxes shall be accessible and locations shall be recorded on "As Built" drawings.

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- S. Door contacts shall be located 6" from strike side of door and both the switch and magnet shall be "glued" in place with clear silicone. Wiring shall enter door frame through jamb. Do not drill headers.
- T. Each detector installed in this contract shall have a popit. Each door contact installed in this contract shall have a popit, unless door contacts are shown grouped on drawings. In rooms with accessible ceilings, mount popit in junction box above ceiling. Where hard ceilings occur, provide flush box high on wall or on ceiling with blank finish plate. Wiring shall go to popits, then down to detectors.
- U. Protected areas accessing remote keypads shall be wired and connected on delay zone, separate from all other protected areas.
- V. After all equipment is installed and is operational, Intrusion Alarm System subcontractor shall set angle settings, sensitivity settings, etc., of each detector to ensure optimum performance and minimal false alarms. Mask out areas of each motion type detector to remove sources of false alarms (windows, heaters, air diffusers, etc.) from detection zones.

3.02 CONSTRUCTION MEETINGS

- A. The Contractor shall schedule construction meetings at the jobsite as follows:
 - 1. Pre rough in meeting shall occur before installation of any boxes, raceways, etc. Exact locations of all detectors shall be established as recommended by the Intrusion Alarm System subcontractor.
 - 2. Prewire meeting shall occur after raceways are installed and prior to pulling of any wire or cable.
 - 3. Pre termination meeting shall occur after wire and cable has been installed and prior to termination.
- B. Meetings shall be scheduled by the Contractor on a building-by-building basis and shall include the Project Inspector, School's Representative, the electrical subcontractor, and the Intrusion Alarm System subcontractor as a minimum.
- C. One-half to three-quarters of the way through project, District Facilities will set up a meeting (preferably at the school site) with decision makers from Facilities, Police Services, Maintenance, Maintenance Alarm Tech, General Contractor, Alarm Subcontractor, and School Administrator to review the alarm protocol and to identify responsible personnel and timelines.

3.03 SYSTEM PERFORMANCE

- A. Operation: Activation of an intrusion alarm sensor shall cause a signal to be transmitted to a Central Station via telephone lines. Signal transmission shall be initiated by a built in dialer unit. In addition to alarm reporting, system shall report trouble, low battery, and shunted zone indications.

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- B. Voltage Triggers: System shall provide voltage triggers, which change state for different conditions. Used with devices such as a remote keypad sounder or keyswitch ARMED and READY LEDs.
- C. Audio Alarm Verification Option: Provides a programmable Audio Alarm Verification (AAV) option that can be used in conjunction with an output relay to permit voice dialog between an operator at the central station and a person at the premises.
- D. Cross-Zoning Capability: Helps prevent false alarms by preventing a zone from going into alarm unless its cross-zone is also faulted within 5 minutes.
- E. Exit Error False Alarm Prevention Feature: System shall be capable of differentiating between an actual alarm and an alarm caused by leaving an entry/exit door open.
- F. Built-in User's Manual and Descriptor Review: For end-user convenience, the control panel shall contain a built-in User's Manual.

3.04 TESTING

- A. After all equipment specified herein has been installed and is in operating condition, performance tests shall be conducted to determine that installation and components comply with these specifications.
 - 1. Testing shall be scheduled by the Contractor and shall be conducted at time least disruptive to school activities and as approved by District. Contractor shall provide technicians to conduct all testing (from same firm preparing submittals and performing intrusion alarm work). Testing shall be coordinated to include the Project Inspector and a representative from Engineer's office.
 - 2. At time of testing, Contractor shall ensure that his submittal will reflect all materials and work necessary to make new equipment function properly with existing.
 - 3. Contractor shall furnish all instruments and personnel required for tests.
 - 4. Conduct tests for following:
 - a. Verify that the system is free of grounds or open circuits. The central control board shall indicate when a ground or open circuit exists.
 - b. Verify that devices are functioning as specified.
- B. Testing shall be reconducted to verify correction of any defect found in initial testing.
- C. After system is completely tested, the Contractor shall take the following actions with the Owner:
 - 1. The Contractor will schedule a meeting with the Alarm Sub-contractors and Owner's Representatives to determine alarm zone and device nomenclature. The Contractor shall ensure that the alarm zone and device nomenclature matches the actual building and door or room numbers used by the school. Architectural numbering shall not be used. Once confirmed, the Contractor shall demonstrate this to Owner's Representatives.

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3.05 TRAINING

- A. Supplier shall demonstrate operation of systems and provide training to all end users, administrative staff, and system administrator. Coordinate times of instruction with District, at District's convenience. Supplier shall provide a minimum of 1 hour of user instructions to clerical staff and 2 hours of user/maintenance instructions to District maintenance personnel. Instruction periods shall not coincide and shall be scheduled with District, not school staff. Deliver to Owner at time of demonstration, all settings and codes programmed into system. Furnish three copies on manufacturer's standard programming worksheets. District shall provide list of authorized personnel for training sessions.

END OF SECTION